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June, 1952

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EDISON ELECTRIC INSTITUTE BULLETIN

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PUBLISHED MONTHLY BY EDISON ELECTRIC INSTITUTE

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

February, 1951-1952

SOURCE AND DISPOSAL OF ENERGY—MONTH OF FEBRUARY

	1952	1951	%
GENERATION* (Net)			
By Fuel Burning Plants	22,074,678,000	20,012,105,000	+10.3
By Water Power Plants	9,461,369,000	8,207,268,000	+15.3
Total Generation	**31,536,047,000**	**28,219,373,000**	**+11.8**
Add—Net Imports Over International Boundaries	153,231,000	114,275,000	+34.1
Less—Company Use	116,534,000	131,376,000	−11.3
Less—Energy Used by Producer	377,848,000	401,508,000	− 5.9
Net Energy for Distribution	**31,194,896,000**	**27,800,764,000**	**+12.2**
Lost and Unaccounted for	2,486,733,000	1,756,605,000	+41.6
Sales to Ultimate Customers	**28,708,163,000**	**26,044,159,000**	**+10.2**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of February 29			
Residential or Domestic	39,444,054	37,777,138	+ 4.4
Rural (Distinct Rural Rates)	1,643,844	1,597,800	+ 2.9
Commercial or Industrial:			
Small Light and Power	5,530,135	5,434,565	+ 1.8
Large Light and Power	246,871	246,790	0.0
Other Customers	162,686	157,564	+ 3.2
Total Ultimate Customers	**47,027,590**	**45,213,857**	**+ 4.0**
KILOWATTHOUR SALES—During Month of February			
Residential or Domestic	7,901,598,000	7,016,971,000	+12.6
Rural (Distinct Rural Rates)	496,034,000	475,889,000	+ 4.2
Commercial or Industrial:			
Small Light and Power	5,048,408,000	4,664,168,000	+ 8.2
Large Light and Power	13,699,750,000	12,375,690,000	+10.7
Street and Highway Lighting	318,396,000	281,268,000	+13.2
Other Public Authorities	721,649,000	661,200,000	+ 9.1
Railways and Railroads:			
Street and Interurban Railways	282,460,000	323,802,000	−12.8
Electrified Steam Railroads	205,044,000	203,508,000	+ 0.8
Interdepartmental	34,824,000	41,663,000	−16.4
Total to Ultimate Customers	**28,708,163,000**	**26,044,159,000**	**+10.2**
Revenue from Ultimate Customers	**$514,575,300**	**$469,373,200**	**+ 9.6**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—For 12 months ended February 29			
Kilowatthours per Customer	2,037	1,867	+ 9.1
Average Annual Bill	$57.04	$53.40	+ 6.8
Revenue per Kilowatthour	2.80¢	2.86¢	− 2.1

* By Courtesy of the Federal Power Commission.

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EDISON ELECTRIC INSTITUTE BULLETIN

Volume 20 JUNE, 1952 No. 6

Vision in Power

By Philip Sporn

President, American Gas and Electric Service Corporation

An address before the American Power Conference, Chicago, Ill., March 27, 1952

THE role of power in the life of a country like ours is out of all proportion to its economic value as determined by price. First produced commercially here some 70 years ago, electric power has today become an indispensable part of the daily living of most Americans: in the home, in community functions, on the farm, and particularly in industry. In the prodigious beehive of industrial activity that constitutes the strength and achievement of this nation, electric power is the energizing force without which most industrial, and even home, activity would be impossible.

Engaged as we now are in an effort of vast scope to build up our defenses and to strengthen the defenses of other free nations, it is necessary to utilize all our resources to produce armor powerful and plentiful enough to restrain potential aggressors, or to defeat them if war comes. In bringing all this about, power will play a decisive role. It is even more vitally linked with peacetime progress and our ability to continue to grow and provide for the physical and spiritual welfare of an expanding population.

True Place of Power

The true place of power in our overall picture may be gauged better if these introductory statements are expanded.

First, it is much too categorical a statement to say that power and national welfare are synonymous. Power is vitally important in industry, for example. Yet in most industry, the cost of power represents a bare 7/10 of 1 per cent of the cost of production, but power can be critically important: it becomes critically important if it is absent.

Second, the role of power is growing. With all the attention that the development of our natural gas industry has recently been receiving and all the optimistic hopes that are being held out for atomic power, these, after all, are forms of fuel, and fuel is only one element, though an indispensable one, in the development of power. Electric power is the one form of energy that man has been able to produce that is ideal from almost every standpoint in every sphere of man's activity, and this aspect of electric power is constantly gaining greater recognition.

Third, utilization of power is subject to an unusual rate of growth. It is well known that any given rate of growth may be out of the ordinary for one industry and yet be normal or below normal for another. But use of electric energy is still increasing so fast that its growth pattern is not yet fully established. This characteristic of an undefined growth pattern, by any standard of comparison, can be matched only by very young industry. Truly, in the case of electric power, it can be said: past is but prologue.

Fourth, the importance of power in national defense cannot be overemphasized. Electric power is one of the key factors in mobilizing our industrial resources. This is true of all defense industry. It is especially true of many special war industries developed in recent years in which power plays an even more significant role than it does in such operations as aluminum reduction or in electric steel manufacture. As cases in point, we have the atomic diffusion or separation plants at Oak Ridge, the similar plants being built at Paducah, and other nuclear operations in a less advanced stage of technical development which are now also under construction.

Fifth, electric power has a part to play in assuring peace or in restoring peace, if we should have to undergo the ordeal of war. This is because the bringing about of a condition of peace is inevitably linked up with the problem of acceptance, by the masses of the world, of belief and faith in our system of freedom—political and social-economic. But this in turn is tied to the problem of improving and of kindling hope for further improvement of the lot of the average man all over the world. That improvement cannot come except by mechanization and further improvement in our own productivity as a prelude to helping the less industrially advanced peoples of the earth improve theirs. Of necessity, all this involves more electric power.

Technical—Economic Aspects

Sixth, if we are to get maximum utilization of electric power, we need the most economical development and the most economical operation, for only by insisting on such criteria will we bring about the result sought, with a minimum call on the country's resources and manpower.

Production of electric power is a most complex and unique technical-economic operation. Not only does it require large quantities of capital per unit of capacity and energy produced, transmitted, and distributed, but the economics of the enterprise naturally demand a low rate of depreciation—a rate very close to that provided by consideration of physical life due to wear and tear. This requirement calls for a great deal of advance planning to avoid obsolescence due to inadequacy. That in turn means long reaches into the future, for unless the fog of the

future is pierced by vision, neither size nor technical dimensions can be visualized. As a matter of fact, unless social-economic trends are visualized, the very foundation for future systems cannot be developed. In short, sound development of power systems is not possible unless boldness and imagination—vision—in projection and conception are intermingled with technical soundness and economic responsibility.

Vision obviously isn't introduced merely by making engineering studies and evaluations or economic projections—even though these activities help. The technical studies, as often as not, stop short just at the point where they need very much to advance. To paraphrase John Tyndall—we cannot stop abruptly where our slide rule value ceases to be of use. Here vision is needed; here special insight and intuition are required to supplement the purely technical judgment. Vision obviously cannot be confined to things physical in a field such as electric power, where perception is needed in the social, social-economic, and even political sphere. Like a good many chemical reactions which cannot occur except in a solution of a certain pH, vision, it seems to me, is impossible except against a background of understanding of the life of the community, recognition of the aspirations of the various segments of the population, and awareness of the basis of their economic well-being and of their social habits.

Speed and Transience

To some extent, vision has the characteristics of being both swift and transient. In an instant one may see clearly and boldly a full development, a system, or the consequences of a policy, and in that instant one may get a clear basis for judging intrinsic worth, economic soundness, or basic wisdom of each of these, respectively. An almost infinite amount of work may be necessary to fill in various phases of the picture before it can meet, in the light of cold judgment, the test of reason, and analysis. It may even be necessary to invent new tools, devices, and organizations not previously tried or known. But unless the end vision is clearly kept in mind, these will never come into being, and the end so desirable and desired will never be brought about.

The discussion thus far has been very general in character. It should be possible to relate these observations in some measure to concrete experience. Consider, for example, some recent projections into the future made on the American Gas and Electric Co. System.

The peak demands of the American Gas and Electric System over a period of a quarter of a century have been as follows:

Year	Maximum One Hour Peak Demand
1930	614,000 kw
1939	909,000 kw
1951	2,700,000 kw
1954 (estimated)	3,600,000 kw

Thus, between 1939 and 1954, demand will have quadrupled; this is equivalent to a compound growth of 9.6 per cent per year. If this rate of growth should continue to 1970, the system demand at that time would be 15,600,000 kw. The average rate of growth over the period 1930-1950 was 7 per cent. If this rate of growth is used to project to 1970, a demand of 9,300,000 kw is indicated. If the 7 per cent rate of growth is used as a basis of projection from the reasonably certain 1954 demand base, then the demand to be looked forward to in 1970 is 10,700,000 kw. Thus, it appears that, depending upon what rate of growth is chosen for the purpose of projection, the 1970 demand that may be expected will vary between 9,300,000 kw and 15,600,000 kw.

Similarly, the application of suitable load factors to the peak demand projection indicates a possible system input in 1970 of between 57.2 by 10^9 and 96.0 by 10^9 kwhr. These compare with the 1951 figure of system input of 15.96 by 10^9 kwhr.

None of these relatively simple projections have been accepted as serious indicators of what demand and system input are likely to be in 1970. But they have been catalytic in generating a view of the possible growth and development of a complete power system unimaginable only a few years ago. And they have served to bring into focus a host of problems that will be pressing for solution, some of which had not been encountered previously and others which, while they may have been met earlier, will appear in a form so much sharper and more critical as to constitute new problems. As the implications of the outlook are scrutinized, two things are plain:

1. Demands of the order indicated will never come about unless they are visualized, prepared and worked for.
2. The solution of practically all of the major problems incident to such enormous increase in demand will never be achieved or be worked out soundly unless they are visualized and developed in congruence with the main vision.

What is that main concept? I believe its outlines are quite clear:

A social-economic institution closely intertwined with the economic functioning and, therefore, dedicated to meet the requirements of its service area (existing, growing, and expandable to the maximum extent in the future, even when quadrupling of present limits is indicated on the part of all classes of consumers: urban-residential, rural, commercial, industrial, municipal, county and state, and other governmental), utilizing for that purpose new aids and instrumentalities, technical and economic—some developed by others, and some by the company itself—to carry out the functions of generation, transmission, and distribution in the most reliable and most economical manner, and so developing utilization of electric energy to the utmost.

Promoting Community Welfare

The objective of all this? To promote the security and social-economic welfare of the community, the citizens served, and of all the people cooperating in rendering that service: owners, managers, supervisors, and the thousands of members of its large family of employees.

The conception goes farther. It includes in its scope service and worth. It definitely reaches a horizon of social usefulness and responsibility as a basis for maximum assurance of continuing to function. This, in effect, merely recognizes the danger of a vacuum created by failure to respond to opportunity or need. Of course, indispensable prerequisites to assurance of continuity of function are trust and confidence in the ability of the country, its institutions, and its people to progress and move forward.

With that outlook clearly before one, the many problems, some quite difficult, brought about by such growth and expansion as I have indicated, fall into their logical places, and all can be worked out and in harmony. Planning, building, staffing, operating, and the problems associated with all of these, take their cue from the main theme.

Consider, for example, the problem

of generation and the question of generating plant sites. Who, in the light of the prospects I have indicated, can become careless with a good site or indifferent to the importance and value of developing prime sites sufficiently ahead of needs to be sure of availability when actually needed? Who can project a program that involves underdevelopment or under-projection of a good site?

Or examine the basic question of fuel. With quantities of energy of the order indicated to be generated, fuel as the one indispensable and most important element in providing mass generation of electric energy becomes something more that a commercial commodity to be obtained as needed by asking for bids from prospective suppliers. The importance of exploring a whole series of questions—sources, reserves, technical and economic soundness of entrepreneurs—becomes apparent. And the question of the competitive position of various fuels: coal, oil, gas, char, when and if it becomes a significant commercial commodity, and atomic fuel, when and double "if" it becomes a commercial item—all of these fall into their proper places, both as to the present and in-time scale as well.

Again, consider the question of turbine and boiler sizes. I have been told of system planners or executive directors who within the past year or two have declared that they *never* would have need for units above a certain size—say 50- or 60,000 kw. I do not say that this particular rating may not have been the ideal rating for that particular system at a certain time, nor would I deny that larger sized units bring with them additional technical and economic problems. But it must be obvious that only those who visualize inadequately can hobble themselves and the system they project by categorical prejudgment as to what size they will or will not permit to be utilized in the growth and development of their system.

Or take the questions of temperature, pressure, and cycle in the modern steam electric plant. All the heated arguments as to whether 900 psi, 850 F, constituted or did not constitute a natural limit to further progress in thermal and economic efficiency, and all the fear, uncertainty, and hesitation as to whether to reheat or not to reheat, show up in their true perspective in the illumination furnished by a broad picture of the system and development ahead. How, in the light of expansion potentials such as I have indicated, can one rest on present limits of performance as long as science and technology are opening up new vistas?

For a period of years, we have been having controversial discussions about the economics of this or that extra-high voltage—220, 287, 330, and even 400 kv. I have heard engineers of standing and accomplishment say that they could never see the usefulness of any higher voltage than 220 kv. And yet it is obvious this is no subject that can even be half rationally studied and analyzed until something more than present or relatively close-at-hand system projections are made and studied. Here in particular, the view of a system going well beyond anything that is called for in the present is a necessary prerequisite for technical development and for bringing about economic realization in the form of savings in capital and operating costs.

Vital Element

Of all the elements that have to be brought together in a soundly conceived and efficiently functioning electric power organization, none is as important as people—the people necessary to visualize, plan, build, direct and operate. People endowed with skill, people trained in many specialized fields, people of character—productive people. But, in a complex industry like ours, such people can only be found and are only available when needed if they are brought into the industry at the right time and if, subsequently, they are properly trained and permitted to develop. But if this need isn't projected and communicated to others—to those directing the affairs of our secondary schools, of our colleges, and technical schools, to the faculties of those schools and to their students—how can one expect young people to become enthusiastic about allying themselves with a vision-less industry? How can you expect them, by their demand for training and instruction, to exert pressure strong enough so as to bring into being schools adequately equipped and manned by faculties of high competence and inspiring leadership?

It seems clear to me that the personnel problem—the problem of bringing in the right people and the problem of keeping them inspired, happy, and productive—can only be solved with many years of effort as a part of the conception of the long-term picture of the industry. Without this vision, the realization will be patched, partial, inadequate, inefficient, and uncertain. Given this outlook, it can be made whole, fully adequate, sure, harmonious in its functioning, and highly efficient and productive.

Industry today is confronted by problems that, in terms of size and scale, go beyond anything that could have been reasonably projected only a relatively few years ago. For example, one large power group is today wrestling with a

(*Continued on page* 207)

Carolina Power & Light Sponsors Contest to Stimulate Community Development

A CONTEST to make the Carolinas a finer place to live and work was announced recently by the Carolina Power & Light Co. at 69 dinner meetings held simultaneously throughout the company's service area. Based on the theme of "Building a Finer Carolina," the contest offers $8,750 in prizes for towns which display the greatest improvement in community development this year.

The contest is open to the 340 communities whose electricity is served at retail by Carolina Power & Light. These communities had until April 1 to enter the competition, which will extend to November 1, after which contestants will be judged on improvements made during the previous 12 months.

Towns will be urged to make surveys of needed improvements with a view to selecting five specific projects on which to work for prizes, and Carolina Power & Light will aid contestants in conducting such surveys.

Contestants will be divided into three population groups competing for three sets of prizes of $1,000 each for winners and $750 each for runners-up. The first group will consist of towns with a population of 1000 or less; the second group, of towns with a population of 1001 to 2500; and the third, of towns with a population of over 2500. In addition, two prizes of $1,000 each will be awarded to North Carolina's finest town and to South Carolina's finest, regardless of population size. Thus, it is possible for one town to win $2,000 in prize money. There will also be 15 prizes of $100 each for towns receiving honorable mentions.

Residents of Lower Mt. Bethel Township entering Centerfield School Auditorium where PP&L held "Howdy Neighbor" night. Chatting at far right is PP&L President Charles E. Oakes.

PP&L Conducts Community Meeting to Explain Plans for New Martins Creek Plant

RECOGNIZING that the building of a multimillion-dollar power plant brings a great influx of construction workers into an area, as well as increased traffic from incoming materials and supplies, the Pennsylvania Power & Light Co. conducted a "Howdy Neighbor" get-together recently in the Centerfield School Auditorium, Martins Creek, Pa., in order to acquaint residents of that community and Lower Mt. Bethel Township with plans and problems attending construction of the company's new Martins Creek Power Plant on the Delaware River.

According to PP&L, "Howdy Neighbor" night, held from 8:00 to 9:30 p.m. on May 8, served a two-fold purpose. First, it provided an opportunity for township residents to gain first-hand information on company operations and the new plant, upon which construction has already started. Secondly, with company officials presenting the facts, the get-together enabled residents to meet PP&L management in an informal, neighborly fashion and to ask questions about the company.

Invitations, along with reply cards, were sent out to residents of the Martins Creek area after a list of such residents had been compiled from files in Lower Mt. Bethel Township. Representatives of the press were also invited to attend. Advance publicity releases, as well as subsequent write-ups of the get-together, were prepared for local newspapers, and a "reminder" advertisement, which called attention to the coming function, was inserted in the *Easton Press,* the largest circulated daily newspaper in the area.

Response to "Howdy Neighbor" night was enthusiastic, and more than 500 people assembled in the Centerfield High School Auditorium, which was decorated with displays illustrating PP&L's post-war growth of generating capacity and electricity's role in the nation's "Production for Freedom." A program, which contained pictures and biographies of the speakers, was distributed, and, to give residents some conception of the steps involved in power plant construction, a half-hour color motion picture depicting construction of the company's new plant at Sunbury, Pa., was shown. Following the formal presentations, refreshments were served.

Principal speaker was Charles E. Oakes, President of the company, who focused attention on the electric industry's vast expansion program and explained that an expenditure of 288 million dollars for the ten-year period ending in 1955 will have been made by PP&L alone. Included in that figure is the new Martins Creek station which, it is estimated, will cost more than 30 million dollars. Orders for equipment totaling over ten million dollars, Mr. Oakes said, have already been placed.

Included among the other speakers were James C. Knowles, Vice President of the Lehigh division; George M. Keenan, Vice President and a recently elected Director of the company; Bert C. Seitzinger, Project Manager and in charge of Sunbury Plant construction; Harry T. Jansen, Assistant Project Manager; Richard Forbes, Superintendent of the Martins Creek Plant; and Steven Nemeth, Chairman of the Board of Supervisors of Lower Mt. Bethel Township.

Preceding the evening program, Mr. Knowles conducted a shorter afternoon presentation for pupils at the school. He discussed the new plant and showed a full-color motion picture cartoon which, in a simple and interesting manner, told the story of electricity. Refreshments were also served to the students.

Upon conclusion of the program, refreshments were served to guests. The school was decorated with displays illustrating electricity's role in America's "Production for Freedom."

Management's View of the Power Sales Job

By Sherman R. Knapp

President, The Connecticut Light and Power Company

From an address before the 18th Annual EEI Sales Conference, Chicago, Ill., April 1, 1952

An electric company's best interests are identical with the best interests of the people in the area in which it operates. Many electric company people have recognized this community of interest for a good many years, but relatively little progress has been made in selling the idea to our customers.

We have been explaining for a long time that our investment in facilities was anchored to the area in which we operate, and therefore a prosperous community was essential to the prosperity of the company serving it. We have pointed out time and again that an electric company differed from a manufacturing concern in that it is impossible for it to move from one section of the country to another, as a manufacturer may do, in order to take advantage of changing economic conditions. Somehow or other, this story hasn't altogether clicked, although substantial progress is being made in some areas.

Public Reaction to Monopolies

I suspect that one reason for our difficulty stems from the monopolistic character of our business. Years ago the general impression was created, whether deserved or not, that electric utilities felt they were doing their customers a favor by letting them enjoy the blessings of electricity. People resent monopolies, even though they may understand the economic reasons for their existence. The average individual is jealous of his right to select the person or firm with whom he prefers to do business. If he doesn't like the way the soda jerk in the corner drugstore says "What will you have, Bub?" he can exercise one of our fundamental freedoms as well as one of our most potent economic tools by taking his trade across the street to another drugstore. The fact that this freedom of choice is denied most purchasers of electricity makes it particularly important that we eliminate causes of dissatisfaction in all our business dealings with our customers.

The electric industry, or at least a substantial part of it, is trying to create a more favorable public attitude in its battle for survival against government competition. In addition to the job which each company is doing at the local level through newspaper advertisements, bill inserts, and other media, there are several national groups working along different paths but leading toward the same goal.

Despite the time and money that are going into these public relations efforts, we cannot expect them to do the job alone. The best explanation that I have heard of why this is so was given at a meeting I attended in New York recently, in a discussion of trends in public opinion. One of the speakers pointed out a very basic fact—that you can't change anyone's opinion through the medium of words, either spoken or written, unless that person is sympathetic to your view. In other words, we must earn the confidence of the public through our actions before they are willing to listen to what is too frequently thought of as power trust propaganda. The same idea is expressed by making a slight switch in the title of Dale Carnegie's famous book, "How to Win Friends and Influence People." I would change that to "You must win friends before you can influence people." We must demonstrate to our customers that we are honestly and actively promoting their interests, and in so doing we are adopting the only sound means of promoting our own interests.

There is a part for every employee to play in this program of selling the electric company to the community. I believe, however, that the industrial power representative has an opportunity to play a somewhat more significant role than most other employees because of the character of his job and the qualifications which he must have in order to fulfill that job successfully.

One of the objectives of the industrial power representative is the improvement of the competitive position of each customer within his industry. That certainly is pertinent to the overall objective. Every time a power engineer can sell a customer on an idea that will improve quality, reduce waste, or increase production, he is making a substantial contribution to the welfare of his company. Frequently such an idea will result in greater use of power directly, but even if it doesn't it will mean greater profits for the customer, higher payrolls, and more spendable income in the community. Inevitably that will mean greater use of the company's services.

These days the industrial power representative has the additional incentive of helping to increase production in the interest of national defense. It is increasingly important that electric power be utilized as efficiently as possible and that production methods be improved to make the best possible use of available manpower and materials. Industry quite generally recognizes that more kilowatt-hours per man-hour will pay off in greater production at lower unit cost. In the majority of the cases, however, it is up to the power engineer to supply the "know how" in specific applications. The "Production for Freedom" program that is being organized on a national basis this year is one that the industrial power representative can wholeheartedly and enthusiastically support.

Knowledge of Tax Matters

In addition to the regular tools of their trade, as outlined in the EEI Power Sales Manual, there are other phases of business with which power representatives should be familiar, if they are to be of maximum service to their customers. For instance, it is important to know how the present Federal income tax law affects customers, because frequently it has a bearing on whether they will invest money in power-producing or power-consuming equipment. Power representatives should also understand how the tax law reacts on a regulated industry during the present inflationary period. Most people today recognize that increased costs make it necessary for electric companies to raise their rates. I doubt, however, if one in a hundred realizes that in order to re-establish a reasonable return on its investment it is necessary for the company

to raise its rates more than two dollars for each one dollar of additional cost it is trying to recoup. If you haven't done so, I suggest that you read the testimony given by Charles E. Oakes, President of Pennsylvania Power and Light Co., before the tax committee of Congress last year on this subject.

Another matter of great importance to the electric companies and their customers that the power engineer can do something about concerns the industries' battle with the control agencies in Washington for materials and equipment necessary to serve adequately the increasing demands for electric power. It doesn't make sense for the government to grant priorities for defense production facilities without making adequate provision for the power to operate them. The estimates of the Power Survey Committee, however, indicate a serious slippage in the completion of power production equipment due to material shortages. By acquainting his customers with this problem, the power engineer can aid in enlisting their cooperation to the end that a sensible balance be maintained in the allocation of materials between power-consuming and power-producing facilities. Last fall our company sent a letter about this matter to 400 of our largest industrial customers and enclosed a copy of one of the advertisements of the Babcock and Wilcox Co. which very effectively told the story. We were very gratified at the response from our customers, and I am sure their influence has been helpful in improving the situation.

Participation in Community Affairs

The things which I have mentioned are all quite closely associated with the industrial power engineer's day-to-day work with his customers. There is, however, another broader field of activity which offers a great opportunity, namely, the job of being a good citizen in the community. While the industrial power representative is usually an engineer by training, he has also been exposed to the principles of selling, which should mean that he is better equipped than most electric company employees in getting his ideas across to the public. He has a wide acquaintance among the people of the community through his regular job, and he is usually able to express himself well before a group of people. While most managements reject the idea of directing their employees to participate in community affairs for the specific purpose of improving the standing of the company, nevertheless, it is natural for management to hope that those employees who do understand the electric companies' problems and are best able to assist in solving them should take an active part in civic affairs in the interest of the community, the company, and the individual himself.

Business and Public Welfare

Just recently, I was talking with a professor of economics at one of our eastern colleges, who differed from many economics professors in that he recognized the importance of sound and profitable business to the public welfare. He was also conscious of the fact that today all governmental bodies, from the community on up to the national government, are made up of people who, for the most part, are unsympathetic or apathetic to business. He had a strong conviction that business management was making a big mistake in not encouraging its key employees to take a greater part in the formulation of government policies through membership on such groups as town councils and state legislatures. I realize that this is a very touchy subject, particularly with electric companies, but I am inclined to think there is a great deal in what this professor of economics had to say. No less a person than General Eisenhower has indicated that we could not hope to maintain our economic system if we leave politics solely to the politicians.

On February 27 of this year nine electric companies in New Hampshire, Vermont, Massachusetts, and Connecticut that serve the Connecticut River Valley watershed invited about 50 residents of the area to a meeting at Hanover, New Hampshire, to discuss the formation of a conservation organization covering the whole valley. This group represented agriculture, industry, and recreation as well as specific interests such as abatement of pollution, power development, better land use, and so forth. The idea was well received, and now an organization committee is drawing up plans for the establishment of a permanent organization. The principal purpose of this activity will be to promote public interest in the various problems in the valley and to coordinate the work of the many separate groups interested in a particular phase of the overall job. In connection with this project the electric companies produced a movie entitled "Your Valley—Your Future," featuring Lowell Thomas both as an actor in the movie and as the narrator. This film tells the story of the past development of the river and what could be done in the future. It is designed for use at luncheon clubs or similar gatherings, and I expect it will be shown to the majority of the people in the valley in the next year.

We are experimenting with another program which I want to mention because if it proves successful it can have far-reaching results. A couple of years ago we started giving a course in economic education to all of our employees, which has proved definitely worth while. One of our men who handled this course happened to be a member of a citizens advisory committee to the board of education in one of our larger towns. He showed the course to the committee with the idea that it would be a good thing to use in the schools. The course is a straightforward explanation of how our economic system functions and what it has accomplished. There is absolutely nothing in it that could possibly be construed as electric company propaganda. The advisory committee approved the idea but one of the members, a plumber, wanted to know what the "gimmick" was. He couldn't understand why an electric company should spend the time and money promoting something which had no direct connection with its business. He was finally convinced that our only purpose was to help preserve our free enterprise system by developing a better understanding of how it works through education. This is a slow process, but I am convinced it is worth the effort.

Clearing Up Misunderstandings

Once the public recognizes the electric company's interest, through the actions of both management and employees, in developing and maintaining an attractive and prosperous community, there is much that can be done toward clearing up some of the misunderstandings which exist about our business.

In our area, for instance, the idea was put forth a few years ago that one of the principal reasons why the textile industry was moving from New England to the South was because of high electric rates. It isn't hard to understand that this idea was not a particularly healthy

(*Continued on page* 204)

The Farmer and His Problems

By Herrell DeGraff
School of Nutrition, Cornell University

An address before the 18th Annual EEI Sales Conference, Chicago, Ill., April 1, 1952

ALMOST 30 years ago, a high-line came down the highway past my home farm in western New York, and the farm became electrified. Electricity replaced kerosene lamps and lanterns. It pumped water. It powered the farm shop. It took over many burdensome chores which previously had been done—or so it seemed to me—by boy-power. But, only a few years after electric service came to the farm, I left and, consequently, have not participated directly in the adaptation of electric energy to the ever-increasing number of jobs which, on well-managed farms, this cheapest-of-all-hired-hands has come to do. But I have remained close to agriculture, including the home farm and many others, and thus do have an appreciation of what electric energy does mean and can mean to farm families.

American agriculture over the years has been remarkably successful in its major responsibility to society, that is, in the production of the essential soil products for the maintenance of our non-farm population. Without supplies of food and fiber beyond the consumption requirements of the people on the land, we could have no cities, no industry, or no commerce. That statement is a truism, but it refers to a situation so remote from the realities of our economic life that we never think of it. And yet, it is worth calling to mind, if only to emphasize the fact that American agriculture has been so successful in its production accomplishments that this is no longer essentially an agricultural nation.

Agriculture and Urban Growth

If that thought seems a little obscure, let me express it another way. Strictly on the basis of its enormous productivity, the United States has come into a position of leadership among the nations of the world. We have in this country a little over 6 per cent of the world's population, and we turn out 11 to 12 per cent of the world's total farm products. Even so, it is not our farm output, great as it is, that has established our position in the councils of nations nearly as much as it is the production of our non-farm industry, with special emphasis on coal, petroleum, electricity, steel, chemicals, and machines. This country now produces roughly 45 per cent—nearly half—of the world's total industrial production. These are the goods which speak most forcefully in a power-dominated world. But a major factor in our national capacity to achieve this volume of industrial output has been a progressive agriculture which has continued to provide an adequate foundation for an ever-expanding urban growth.

Throughout the past 100 years, the proportion of the national labor force engaged in agriculture has declined at an almost constant rate of one half of one per cent a year—5 per cent each decade. Such a trend cannot go on forever, but since 1850 it has shifted 50 per cent of the labor force of the country from farming to the manufacturing and service industries. One hundred years ago only about one family in three lived an urban life and was engaged in non-agricultural pursuits. Now barely more than one family in seven is engaged in agriculture. Close to 85 per cent of the national labor force is employed at non-agricultural work, and only about 10 per cent is in commercial agriculture.

Standard of Living and Production

In many respects, the significance of these changes cannot be overestimated. A high national average level of living never can be produced from agriculture alone. In addition to abundant food and fiber, we consider many other things essential to the way we like to live, including automobiles, electrical appliances, central heating, modern plumbing, and other conveniences without end. These are produced and can be produced only when a major part of the labor force is released from the necessity of grubbing its own food. We have produced these things—and food also—to the point where, by world standards, we have an astonishingly high level of living in peace time and an enormous capacity to produce for war when necessary. And without slighting in any way the production advances which have been made in non-farm industry, we still may say that this high level of living and the great productive strength of the nation would be less than they are had it not been for the changes which have taken place in farming, through which so much of the national labor force has been released from agriculture to engage in the production of other goods and services.

But the remarkable production successes which have been achieved in farming, rather than meaning that all farm problems have been solved, mean instead that many problems have been created. One is the enormous increase in the amount of capital required for a successful commercial farm and the high cash costs of farm operation. And a second, which follows directly from the first, is the danger of losing the highly flexible and progressive agriculture that we have had in the past to an increasing degree of governmental control. To be sure, there are many other present-day problems of agriculture, but I am choosing to confine myself largely to these two.

First, let me note that many and varied as the changes in agriculture over past decades have been, most of them may be classified into two types: (1) an ever-increasing application of science to crop and livestock production, which has increased yields per acre and per animal, and (2) the ever more rapid adoption of new and improved tools and equipment—mechanization which has sharply increased the number of acres and of animals which could be cared for by each farm worker.

Capital Requirement

Both types of change have increased the capital requirement and the cash operating cost in commercial farming, and both are largely unavoidable if the farm business is to become and remain successful. The equipment cannot be dispensed with—no one can make wages with a hoe or even following a team. Enough land and livestock must be provided to use machinery and buildings efficiently. Fertilizers, seeds, feeds, chemicals, etc., must be bought and paid for.

What all this has meant in one farming community is revealed in a compara-

tive study of farming operations in 1907 and 1947 in the Town of Dryden, Tompkins County, New York. Figures concerning precisely the same area and, insofar as possible, the same farms show an increase in capital investment from $6,400 per farm in 1907 to $23,100 in 1947. Real estate investment went up from $4,600 to $10,500; livestock from $1,100 to $8,400; and equipment from $500 to $4,000. Similar changes in capital investment would be found, if the figures were available, in almost every agricultural community in the country, and in many types of farming the increase has been much greater.

Receipts and expenses on these Dryden farms also provide some meaningful comparisons. In 1907 the average receipts were $1,500 and in 1947, $12,700—or more than eight times as much. On the basis of the sharply increased receipts the higher capital values seem to be fully justified. In fact, at the 1947 rate, the farm receipts were more than 50 per cent of the capital investment compared to less than 25 per cent in 1907.

Expense Figures

The expense figures are equally interesting and, perhaps, even more meaningful. Expenses per farm of $600 in 1907 had increased to $8,700 in 1947, almost 15 times as much. At the 1907 rate, it took 10 years of farm operation for the expenses to equal the farm capital. But in 1947, the expense outlay would be equal to total capital in the farm in only a little over 2.5 years.

It is this high level and the inflexibility of their operating expenses that is causing farmers great concern. They cannot avoid the expenses and continue their commercial system of farming. No longer are farmers free agents, independent of the rest of society, as once in a simpler, more self-sufficing system of agriculture they were. They are about as dependent upon the products of the city (the machines, petroleum, chemicals, electricity, etc. as the city is dependent upon them. And farmers know from bitter experience that prices for their produce may go down. They know also that when the price level declines, their costs go down much more slowly than does the price of their produce, their receipts drop rapidly, their costs stay high. Never before have farmers been so vulnerable to depression, and never before have they so feared depression.

This, of course, is precisely the situation which has brought government price supports into agriculture. Let us recognize that a majority of farmers, at one time or another and under one set of conditions or another, have wanted price supports and have asked for them. But they do not want all that goes with them if price supports are mismanaged.

If what agriculture wants is depression insurance in the form of stop-loss price supports, this is entirely possible —if the price supports are kept at low and flexible levels. That is, we can have this sort of price supports and still have a flexible, dynamic agriculture which makes its own adjustments to changing market demands. But to say that we can have them is not to say that we will. Price support for agriculture, like benefits for veterans or special privileges for labor, is a decidedly attractive political plaything, to the point where one political group characteristically outpromises the other in the supposed benefits it would confer. And when the support levels become too high, rigid and authoritarian government controls have to be invoked to protect the public purse. When this happens the flexibility, the automatic adjustments, and the progressiveness of agriculture are threatened or destroyed. And should this happen, our nation will not be able to look forward with any confidence to the future, because under the hampering hand of bureaucratic authority it will not remain dynamic and progressive. All history teaches this truth. Yet this threat is very real in this country today, and nowhere more so than in farming.

Central Focus of Authority

When price-determining factors are taken out of the market place and handed over to a government agency, immediately there is created a central focus of authority upon which all complaints and all pressures can be brought to bear. What then can be expected in a one-person, one-vote society except that the public agency will bow to the strongest pressures brought upon it and that decisions will be made in terms of the short-run interest of favored groups, instead of in the long-run interest of everyone. Moreover, decisions of the few can seldom, if ever, be more accurate than the collective decisions of everyone, especially if the authoritarian decisions are colored by political favor. This, to my mind, is the supreme reason for retaining the fullest possible degree of the free market. And yet the free market is being threatened seriously for farmers, as for the electric industry. Free markets are not always easy to live with, but the loss of them is a death-blow to economic progress.

If these, then, are major problems for farmers, as I think they are, what can be done about them? They are interrelated, but that does not mean they should receive the same treatment. The second problem (the threatened loss of economic freedom) would be less serious if we had more economic understanding and less economic ignorance among the American people. We need sound and effective economic education in and out of the schools, and we are not getting it. We need it because we must maintain the flexible, dynamic economic system that has given us the individual incentives to production which, in turn, have given us this way of life. Certainly, education is a slow process, but I have no confidence in any other means of reversing the economic drift. It is a job of individual education and understanding and conviction. What hampers the process most of all is that most of us are intellectually lazy and still believe in Santa Claus.

Untapped Business

The other problem (the problem of high farming costs) can be met most effectively by more efficient farming. On this one, too, the electric industry can do a great deal. In fact, I think this one is right down the alley of the rural representatives of power companies. There is a great deal of business out there on the RFD routes that has not been tapped yet.

To illustrate my point, let me refer again to some figures. Since 1910-14 (the period just before World War I), the wage rates of hired farm labor have more than quadrupled. It now costs almost $4.50 to hire as many hours of labor as $1.00 bought in 1910-14. I am going back to this ancient-history base because that was before the days of rural electric lines and also before tractors and tractor-powered field machinery. These figures on the dollar cost of farm labor are not of themselves important. In terms of business success no wage is high, however much it is, if the worker earns it or more than earns it. A farmer's real concern is *how much are wages in terms of the produce he sells, relative to the amount of produce the hired help turns out.*

What then has happened to produc-

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Aluminum Conductor and Connectors

By C. E. Baugh

Distribution Engineer, Pacific Gas and Electric Company

An address before the EEI Engineering Committee Conference, Chicago, Ill., May 7, 1952

THE Pacific Gas and Electric Co. has used aluminum conductor for overhead lines for 50 years, and conductor that was installed 50 years ago is still in service.

I have two samples of 350,000-cm all-aluminum conductor, one 19 strand installed in 1902 and one seven strand installed in 1906. Initial operation of the two circuits on which these conductors were installed was at 60 kv, and portions of both circuits are still in operation at 12 kv. The circuits were strung on wood poles adjacent to the west shore of San Francisco Bay and were the first high-voltage transmission lines into San Francisco. There has been some corrosion of these conductors, as evidenced by discoloration and the presence of salts of aluminum in the strand interstices, but careful examination discloses no measurable reduction of the cross section of the strands. This is not presented, however, as proof that all forms of aluminum will perform equally well or that equally good performance will prevail under other conditions.

The types of splices that were used on these lines were a served splice and a wedge-grip splice, similar in principal to present-day automatic splices. No sealing compounds were used in the splices. Through the years there have been many splice failures, and repairs have been made with twisted splicing sleeves. Spans are short, on the order of 150 feet, and little trouble has been experienced from tie-wire wear or insulator abrasion. It is only fair to say that troubles on these lines have not been due to inherent faults of aluminum as a conductor material, but only to lack of the fundamental "know how" and the proper devices for making splices and taps.

Aluminum as a Conductor

None of the remarks that follow are intended as a criticism of aluminum as a conductor material. Our continued use of aluminum and ACSR conductor is ample evidence of this. It is unfortunate, however, that, after 50 years of use, there are no satisfactory solutions to some of the problems associated with splicing, tapping, and terminating aluminum conductor.

Results in recent years indicate that problems associated with aluminum-to-aluminum connections of all types are fairly well under control. From the standpoint of the user, the principal problems are the selection of properly proportioned connectors, the initial removal of oxide films, and the long-time maintenance of oxide-free contact surfaces. Companies on the West Coast have followed the usual progression from twisted sleeve splices without sealing compounds to twisted sleeve splices filled with red lead and later with yellow zinc chromate, and from twisted sleeve splices to compression splices filled at first with red lead, later with zinc chromate, and finally with one or another of the inhibited greases. Tests in the Pacific Gas and Electric Co. laboratory show that compression splices filled with an inhibited grease have better long-time resistance characteristics than when either red lead or zinc chromate is used, and that greases do not have an adverse effect on the holding power of compression splices.

Defective Compression Splices

The Southern California Edison Co. has an interesting story to tell of defective compression splices in 220-kv, ACSR transmission lines, and two articles by Jordan Lummis, of that company, which appeared in the May, 1951, and January, 1952, issues of *Electrical West,* describe methods used in the detection and repair of defective splices and the use of preformed rods to shunt defective splices. Based on the company's tests, it now appears that serious consideration should be given to the use of preformed splicing rods on large all-aluminum conductor, but it is felt that considerable additional research on this matter is required.

Until fairly recently the major use (tonnage-wise) of aluminum or ACSR conductor on the West Coast has been for transmission or subtransmission lines, and this is generally true of the entire industry.

Since the end of the second World War, the Pacific Gas and Electric Co. has used immense quantities of No. 4, No. 2, and No. 1/0 ACSR, and of No. 4/0, 266,800 cm and 336,400 cm all-aluminum for rural distribution lines. This policy, of course, was determined by the increasing price differential in favor of aluminum and by the overall economies made possible by the use of ACSR on long-span rural lines. Trial installations of ACSR in rural areas prior to the war indicated that the problem of fittings for aluminum conductor would not be too serious if its use could be confined to areas where the atmosphere was not contaminated with significant quantities of salt-water spray or industrial fumes.

No ACSR conductor has been installed on distribution lines in coastal areas in the Pacific Gas and Electric Co. system. One reason for this practice is the expected rapid corrosion of the galvanized-steel core in an atmosphere laden with salt spray almost every day of the year, especially in small conductors where the core is protected by only one layer of aluminum strands. A second reason is the fear that the life of fittings now available for copper-to-aluminum connections would be entirely unsatisfactory under these conditions.

In 1951, for the first time on the Pacific Gas and Electric Co. system, transmission lines using ACSR conductor were extended into the beach area where the concentration of salt spray is extremely high. These lines have been in operation for less than a year and data on which to base a prediction of their performance are not available.

Most Important Problem

For some time we have recognized that the increasing availability and decreasing price of aluminum in comparison with copper would tend to bring about a wider use of aluminum conductor and that this would of necessity result in its use on distribution circuits in urban and industrial areas and probably in our coastal areas. We have also recognized that the introduction of aluminum on distribution circuits would

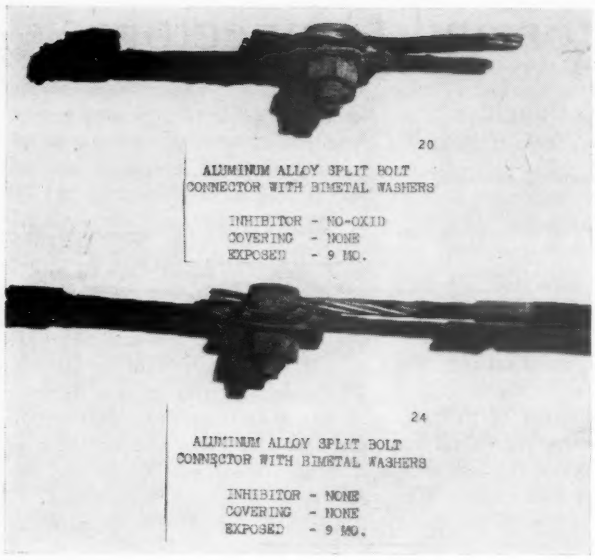

Fig. 1

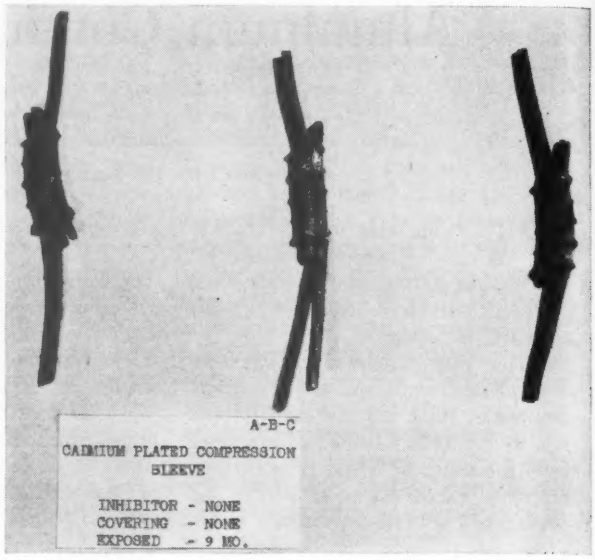

Fig. 2

present problems that are non-existent or of comparatively insignificant moment on transmission and subtransmission circuits.

In our minds, the most important of these problems stems from the multiplicity of copper-to-aluminum joints and taps on a distribution circuit occasioned by the great number of associated devices, such as transformers, cutouts, lightning arresters, capacitors, service restorers, sectionalizing switches, etc., as well as copper service-entrance conductors, each of which requires a transition from aluminum to copper at some point. Unfortunately, this problem is complicated by the fact that atmospheric conditions which are most likely to lead to trouble with aluminum-to-copper connections are naturally closely associated with urban and industrial areas.

With these facts in mind, it was our intention to proceed rather slowly with the further application of aluminum conductor and to confine the first step to covered all-aluminum conductor in sizes Nos. 6 to 1/0. It was also our intention to defer the installation of any aluminum on distribution circuits in coastal and heavy industrial areas—except for experimental purposes—until an investigation of the connector problem could be completed. Thus, a test rack was set up in the summer of 1951 for exposure tests on various types of connections.

At about that time, the rearmament program reached a point where a critical shortage of copper was indicated and pressure to substitute aluminum for copper developed earlier and to a far greater extent than had been anticipated. It was immediately evident that test-rack results might serve a two-fold purpose, in that unfavorable results would constitute a background that would enable us to resist pressure to substitute aluminum for copper under conditions—and for applications—where such substitution would be unwise from an engineering standpoint.

Aluminum is at the anodic (corroded) end of the galvanic series for dilute acid and alkali solutions and—except for zinc—at the anodic end for sea water, insofar as ordinary metals are concerned. The problem of making aluminum-to-copper connections seems to become one of making these connections in such a manner that conducting solutions cannot bridge the two metals at points where they are in close proximity, or of excluding from the joints all moisture which might constitute a conducting solution.

Exposure Conditions

The West Coast offers an excellent opportunity to test the ability of metals to withstand galvanic corrosion under natural, rather than synthetic, conditions. Prevailing westerly winds pick up salt spray on the beaches and carry it inland, depositing a great part of it on areas west of the first reasonably high range of hills. Fumes from oil refineries, smelters, steel mills, chemical plants, fertilizer plants, etc., in the vicinity of San Francisco Bay, are as prevalent as in any industrial area. In the central valley area, there are fairly large alkali deposits and large sections where acid dust from peat soil presents a problem. As a result, troubles with aluminum connectors have shown up on our test rack and in field installations in a relatively short time.

It is our firm belief that the troubles that have developed here are peculiar to our climate and geography only in that they occur in such a short time, and we feel that similar troubles will develop in many places in the country long before the conductor itself has lived its useful life. No urban or industrial area in the country is free of fumes or other contamination which can form a conducting electrolyte and eventually cause trouble with exposed aluminum-to-copper connections. None of us is building lines for as little as ten or 15 years of trouble-free operation, and none of us should tolerate wide-spread trouble with connectors within the life span of the conductor itself.

In confirmation of some of the opinions that have been presented, I have samples of connectors removed from our test rack at Point Lobos and from field installations, and slides which convey this information pictorially. (EDITOR'S NOTE: a few of the slides, designated as Figs. 1-5, are reproduced with this article, and the author's comments on these follow.)

Fig. 1 shows aluminum-alloy, split-bolt connectors (from the test rack), with two bimetal washers, apparently made to the same dimensions as com-

parable copper or copper-alloy connectors. The upper connector was treated with No-Oxid, whereas the lower connector was untreated.

One of the bimetal washers in the upper sample is in bad condition, the aluminum being eaten away on one side of the washer and the copper side split away from the aluminum on the other side of the same washer.

The nut on the lower connector has split in several pieces, but the connector has not been disassembled to determine the cause. This might indicate that the proportioning of connectors with aluminum bodies or bolts should be given careful consideration. The nuts on this and one other sample were found to be split at an inspection in December of last year.

After four months of exposure, the increase in resistance for the upper sample was 8.7 per cent, for the lower sample (with split nut), 4600 per cent.

Fig. 2 pictures three cadmium-plated copper compression sleeves on solid aluminum and copper wires (from the test rack), installed without No-Oxid.

The plating is in bad condition and the aluminum wires are eaten about one-half way through at each end of all sleeves, due to the proximity of the sleeves and the copper wire. Increase in resistance after four months of exposure was 3.0, 3.9, and 5.7 per cent.

Fig. 3 shows a tinned-copper split-bolt connector with tinned-copper washers (from the test rack), treated with No-Oxid. The condition is generally poor with tinning apparently ineffective. The increase in resistance after four months of exposure was 10.4 per cent.

Fig. 4 shows copper split-bolt connectors with bimetal washers (from the test rack). The three connectors at left, which were heavily taped with ten or more feet of Scotch 33 tape, were installed without No-Oxid. The tape was not extended over the weatherproofing, and moisture has entered on all three samples through interstices in the stranded conductors. Considerable corrosion is evident. Increase in resistance after four months of exposure for the upper sample was 11.7 per cent; middle sample, no reading; bottom sample, 2.8 per cent.

On the upper right sample, no No-Oxid was used, but the connector was heavily taped with friction tape, which, together with a heavy coating of No-Oxid on the exposed portions of the conductor, prevented the entrance of moisture. No corrosion is apparent. The

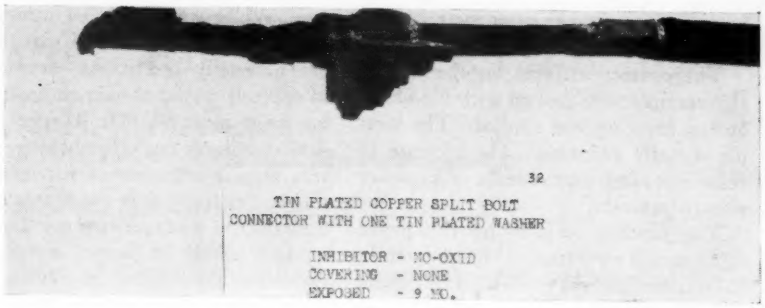

Fig. 3

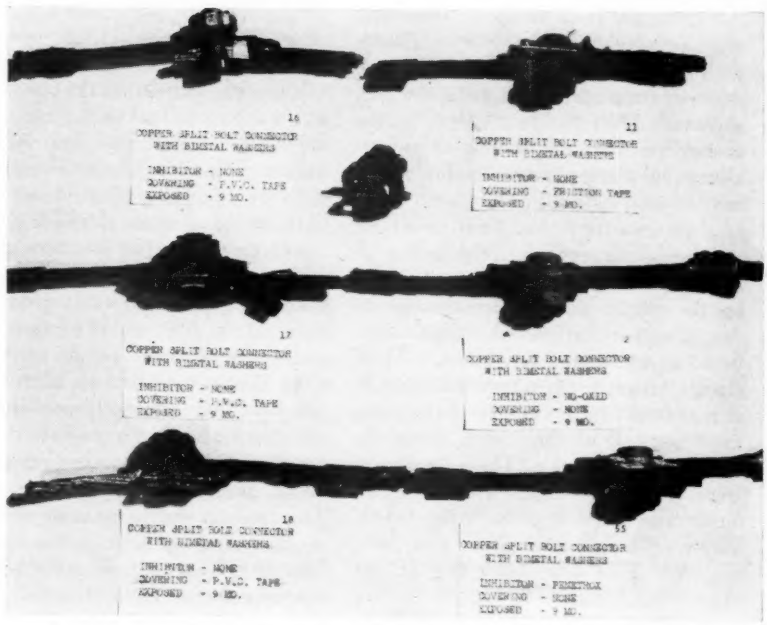

Fig. 4

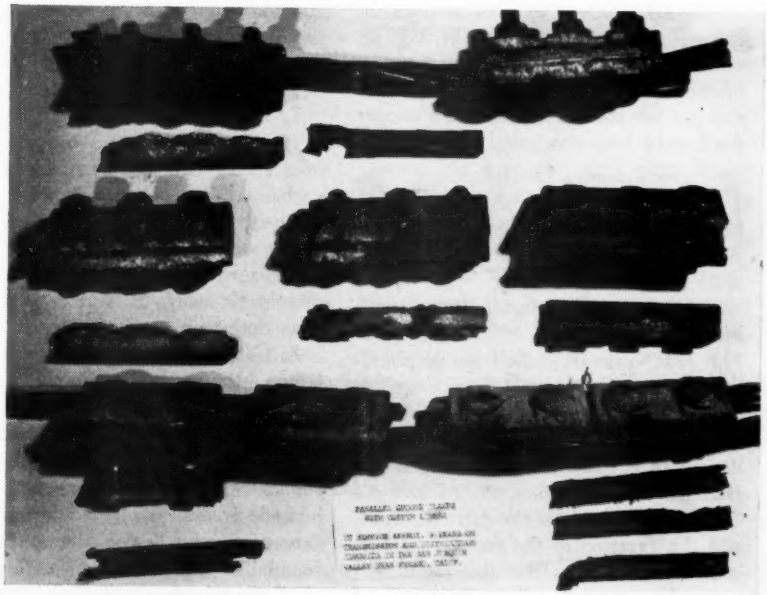

Fig. 5

increase in resistance after four months of exposure was 6.6 per cent.

The contact surfaces on the middle right sample were treated with No-Oxid, but no covering was applied. The sample is badly corroded. The increase in resistance after four months of exposure was 16 per cent.

The contact surfaces on the lower right sample were treated with Penetrox, but no covering was applied. The sample is badly corroded. The increase in resistance after four months of exposure was 15.9 per cent.

Fig. 5 shows a group of three-bolt aluminum-body parallel-groove clamps with soldered copper liners, which were removed from operating lines in the area surrounding Fresno last winter in the course of a routine inspection of copper-aluminum connectors on major transmission and distribution circuits. None of these connectors had been in service as long as three years. The bodies of all of the clamps are cracked or broken on the copper side, apparently due to decomposition and growth of the solder used in attaching the liners. These clamps are nine of a total of over 25 clamps found to be defective during this inspection, all of them with about the same length of service. These clamps are from a rich agricultural area where no measurable salt deposits from wind-blown sea-water spray have ever been observed. This has been going on for many years.

It appears that better performance would have resulted if clamps without liners had been used or if loose bimetal liners had been used. This assumes, of course, proper preparation of contact surfaces and the use of ample quantities of No-Oxid on contact surfaces and the exterior of the clamps and the copper conductors near the joint.

Tentative Conclusions

Certain tentative conclusions have been reached with the hope that more thorough investigation will prove that some of them are wrong.

Briefly, these conclusions are as follows:

1. The intimate association of aluminum and any other metal in an electrical connection will lead to trouble if a liquid electrolyte is present in the joint, the degree of trouble depending upon the strength of the solution, the relative position of the metals in the galvanic series, and the duration of the exposure.

2. In most cases the aluminum will be at the corroded end of the scale.

3. While we agree that atmospheric conditions on our West-Coast beaches are unusually severe, the deterioration of exposed copper-aluminum connections has been so rapid that it appears that similar failures can occur before conductors require replacement for other reasons in any location in the country where atmospheric contaminants are such that an acid, alkali, or neutral electrolyte is formed in the presence of moisture.

4. Connectors with aluminum bodies, bolts, etc., should be properly proportioned, taking into consideration the strength of the parts and the per-unit pressures at which cold flow of the conductor will occur. Pacific Gas and Electric Co. has found that tap clamps without a spring follow-up are not satisfactory when conductors are loaded to values approaching their thermal limits.

5. The proper preparation of contact surfaces of aluminum connectors and conductors is a vital necessity, and the use of non-corrosive greases or other means of preventing oxide formation is essential to the maintenance of low-resistance joints.

6. Copper to aluminum joints in Neoprene- or Polyethylene-covered aluminum wire do not present a problem if a satisfactory method of weatherproofing the joints, with tape or otherwise, can be found. Such weatherproofing must have a life comparable to the conductor life. If it is necessary to remove the conductor covering from stranded wire at ends or elsewhere, moisture can enter the conductor and travel through the channels between strands into joints unless something can be done to seal off these channels. At the moment we see no practicable way of accomplishing this, except at splices.

7. Insofar as general distribution use is concerned, aluminum to copper connections made in *bare* stranded conductor with parallel-groove clamps, U-bolt clamps, split-bolt connectors, or any of their variations are unsatisfactory if corrosive agents are present, as there is no practicable way of sealing the joints against the entrance of moisture.

8. Corrosion in connections on insulated aluminum cable should not be a problem, as such connections must be carefully insulated and moisture must be excluded. The effect on rubber and rubber-like insulating compounds of inhibited greases used to prevent oxide formation must be considered. We have found that highly refined vaselines, such as Calol, tend to dissolve Neoprene-sheath materials and the adhesive surfaces of tapes. Connectors on large insulated cables must be properly proportioned to minimize the effect of cold flow.

9. When aluminum tubing, bus bar, or stranded wire is used in outdoor substation construction, there will be numerous aluminum-to-copper connections at disconnecting switches, circuit breakers, transformers, and other apparatus. It is felt that a practicable method of excluding moisture from these joints must be found. Tapes and similar coverings do not seem to fit into the picture here.

10. There seems to be a need for coordinated study of the problems that have been presented here. It has been suggested that an industry-sponsored research program be undertaken to determine definitely the fundamental nature of the problems and their gravity and to suggest proper approaches to their solution. A subcommittee will undertake preparation of a recommendation in this matter and will welcome any information* that will assist in its deliberations. In particular, we wish to collect data that will indicate the severity of troubles with aluminum-to-copper connectors and will permit us to determine whether these troubles are general or are confined to specific areas or climates.

* Comments should be addressed to C. E. Baugh, Pacific Gas and Electric Co., 245 Market Street, San Francisco, Calif.

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How We Get Volume Sales of Water Heaters

By J. H. K. Shannahan

Supervisor of Residential Sales, Indiana & Michigan Electric Company

An address before the 18th Annual EEI Sales Conference, Chicago, Ill., April 1, 1952

OUR company, the Indiana & Michigan Electric Company, is a member of the American Gas & Electric Co. system and is a 100 per cent electric company. At the end of last year, we served an average of 206,000 customers located in the northern and northeastern part of Indiana and the southwestern corner of Michigan. Seventy-two per cent of our customers are classified as urban and suburban. Approximately 75 per cent of our customers have natural gas available from progressive gas utilities, and throughout our territory, the gas utilities are aggressive promotionally and they also merchandise. We merchandise ranges and water heaters and carry on a dealer program.

In order to understand our water heater sales story, it may be useful to examine first our sales record of the past five years:

1947—	9,385 water heaters
1948—	9,543
1949—	8,527
1950—	12,674
1951—	10,364
Total	50,493

In the five years, ending with December, 1951, there were sold in our territory 50,493 water heaters. This meant an average of about 50 sales per thousand customers each year during the five-year period. The peak of 12,674 water heaters in 1950 represented 62.8 sales per thousand customers. In 1951, with 10,364 sales, we dropped to 50.3 sales per thousand. Our saturation at the end of January of this year, according to the billing records, was 30.2 per cent. At the end of 1946, this saturation was 10 per cent.

This is the record of which we feel very proud. There is no magic formula, no simple ABC's which, if followed, will guarantee results of a comparable nature. I believe that the answer to the question can be found by dividing the subject into two phases: first, the background for sales; second, our specific program starting in 1950 and continuing in 1951 when our water heater sales increased nearly 50 per cent over 1949. Now, the background for sales.

The first prerequisite is an unqualified desire for water-heater business. In our case, we serve a highly industrialized area and we desire a high percentage of residential revenue, which has higher realization, to balance the lower realization from industrial revenue. We think the water heater fits into this picture. Today, our average residential consumption of 2,851 kwh would be about 1,750 kwh without the water-heater load.

There is no need to kid ourselves; the water-heater business is a competitive business. If we wish to obtain a large share of this competitive business, we must have a competitive rate for a competitive service. We feel that our rate meets this requirement, and has much to do with our present saturation.

It is not the purpose of this article to present an analytical discussion of rates or to get involved in a complicated discourse on that subject. Briefly, our rate calls for 24-hour service with graduated blocks of energy based upon the size of the heater, with energy available at one cent. The water heater blocks become effective after 200 kwh per month, and all energy is registered through one meter. Let me point out some of the advantages of this rate.

Around-the-Clock Service

As salesmen, we can sell 24-hour service, eliminating many ifs, ands, and buts. We have no added meters which, regardless of what is said, the customer looks upon somewhat as the prospective bridegroom looks upon his mother-in-law, that is, with a degree of suspicion. In essence, our water heater rate is simple, without complications to confuse a prospect, and we offer 24-hour service, as does our competitor. I realize that all companies do not agree with this thinking on a water-heater rate, but I am willing to bet that most salespeople will agree that it does have advantages when it comes to selling. We feel the water heater gives us an excellent base residential load at a high-load factor, and we like it. We honestly feel that this rate has contributed greatly to our water-heater sales record.

Another major factor has been our emphasis on adequate wiring, or more correctly, our emphasis on adequate service entrance. Slightly over 20 years ago, we started to promote the three-wire, 60-amp entrance, and it was incorporated in our conditions of service. Today, somewhere in the neighborhood of 70 or 80 per cent of our customers have a 3-wire, 60-amp entrance. It can easily be seen what this means on installation costs. Many of our ranges are installed for $15 and water heaters for $20 or $25. This practice has minimized but not eliminated the installation problem.

Promotional Programs

The promotion of various phases of electrical living is not new with us, and consequently, our customers have been exposed to the story for many years. We pride ourselves on being an aggressive, promotional company, and during these years, we have found it advantageous to tie in with and use the various promotional programs offered through the Edison Electric Institute, such as the "Range of the Stars" and others.

These activities have served to keep the electrical living story before our customers. Back in the early days of refrigeration, we were active in that field. Then we latched on to the range in the early days of that appliance, and this year we will pass the 50 per cent saturation mark on that appliance. In the early Thirties, we were selling water heaters, to be sure, in very small quantities. But, by 1934, we had adopted the basic water-heater rate which we still use. I believe it will be understood what we mean when we say that this record of promotional activities extending over the years has contributed to the background for sales.

Coupled with this, and not to be overlooked, is a history of good public relations. Because of this, the public be-

lieved us when we talked about electric water heaters and bought. Then there is the question of service. We have always serviced ranges and water heaters for our customers and for dealers' customers, and the public knows it can get good service on these appliances.

This is the background for sales. It represents many years of hard work and tough selling on the part of our people. And in a very true sense of the word, the 50,000 water heaters sold in the five-year period represent the pay-off for their foresight and energy.

According to the record, in 1950, we increased our water heater sales over the preceding year by nearly 50 per cent and, in 1951, continued at a slightly lower level. We approached 1950 with the desire to secure more water heaters than ranges so that we could bring the saturation of the two appliances closer together, with the consequent improvement in load factor. Up to a point, ranges had always carried a little more emphasis than water heaters. They were considered the leader, the door opener; so now we wanted to close a little of that gap. Basically, our program in 1950 and 1951 was simply to give the water heater a greater share of our sales-promotion dollar and sales-promotion effort, and this was carried out in all phases of our activity.

Advertising Methods

First, our newspaper advertising. We approximately doubled the space devoted to water-heater advertising and adopted the theme, "A Modern Water Heater—Of Course, It's Electric" (thanks to EEI).

We used two direct mail pieces, the first directed to all range customers without a water heater and the second to all customers without a water heater.

We employ the post-card bill which carries a small ad on the face, and we increased the share of this space devoted to the water heater. In the field of outdoor advertising, our billboards and truck posters again saw this increase in water-heater advertising, with water heaters receiving 50 per cent of the space.

On the radio, our spot announcements were almost exclusively devoted to water heaters, and on our other radio programs, the water heater received at least 50 per cent of the commercial time. On our own display floors, we emphasized the display of water heaters, and about this time, a change in our display set-up made available more effective floor displays.

This was also a period which saw a large number of new homes constructed, and in examining the share of this new home business which we secured in 1949, we were vastly disappointed. So, for 1950, we revised and vitalized our builder's program. In this field we had a promotional builder's allowance covering the installation of ranges and water heaters. We realized that the builder was not furnishing ranges with his homes but was required by FHA to furnish a water heater. At the end of 1950, our business in this field was nearly 300 per cent over the previous year, and it increased again in 1951.

The majority of water-heater sales come from dealers. So, again in 1950 and 1951, we increased the number of campaigns carried on with dealers, preceded by a sales training period in which we used to advantage the EEI Sales Training Course. We financed ranges and water heaters for dealers and encouraged plumbers to take advantage of our financing program. Several manufacturers brought out a leader-model water heater at slightly lower prices, and we encouraged dealers to carry this heater. We encouraged, promoted, and participated in appliance shows with dealers throughout the territory, and we had available for dealers display cards, window streamers, banners, and the EEI booklet, "Go Electric When You Need Hot Water." We also experimented with an addressograph service for direct mailing which, frankly, was not a howling success. There were approximately 40,000 pieces mailed to some 26,000 customers.

The plumber received his share of attention and is continuing to do so. Again, in this field we were doing a little experimenting with a plumber-contact man in one of the metropolitan areas. This was set up as a long-range program and it is still too early to judge fully the results. We are advertising in the state plumbers' magazine, and we have presented the EEI Sales Training Program to plumbers and continue to hold meetings with them at frequent intervals. The results to date are encouraging. Plumbers who formerly never bothered with the electric water heater are stocking it, and, in general, the sale of water heaters through plumbers is increasing.

The home service department came into the water-heater picture. We conduct many demonstrations and cooking schools, large and small. There are always moments during such demonstrations when the water heater can be brought into the discussion. We utilized this time and, in addition, in many cases, we introduced another party into the demonstration who discussed the water heater. This proved successful and produced prospects. On home service calls, we also talked water heating.

We have about 150 employees in various categories in our sales department, and most of these are in constant contact with customers. So we adopted a little prospect card which was to be filled out for every one of these contacts, indicating what type of water heater, if any, that a customer desired. This simple device provided a ready classification of prospects which became very helpful. During this period, we made a special effort to interest our employees in water heaters, with the result that our sales to employees increased 75 per cent over 1949.

Sales More Than Tripled

Our company merchandises ranges and water heaters directly. We felt that to obtain the results desired in 1950 we would have to increase our own activities in this field; consequently, we increased the number of our salesmen and we adjusted our commissions to make the water heater more attractive to them. The result was 3,679 company sales in 1950, compared with 1,000 in 1949.

That is a summary of our water heater program during the last two years, and I am confident that there is nothing in it which is new. It may be interesting to note that in other than the new home field, we did not have any allowances on water-heater sales.

As I stated in the beginning, there is no magic formula in our program. I believe in the final analysis that a large amount of the credit must go to those who built the background for sales. Without the basic desire for the water-heater business, without a competitive rate for competitive service, without adequate service entrance, and without good public relations, it would have been very difficult with the best of sales efforts and promotional programs in 1950 and 1951 to do a job of selling. In other words, water heater sales, or other sales, cannot be turned off and on like a faucet. To get results, it takes a long-range program as a foundation for sales activities.

Development of Management Employees

Presented by E. R. Eberle

Assistant to General Commercial Manager, Public Service Electric and Gas Company

Excerpts from a project report of the Joint AGA-EEI Accounting Employee Relations Committee before the National Conference of Electric and Gas Utility Accountants, New York, N. Y., April 7, 1952

COMPANIES in the electric and gas utility industry have for years recognized the need for recruiting and developing engineering talent. Many companies in the industry today have cadet engineering training programs in effect, which have served the very important function of providing well-qualified engineering personnel needed to handle and develop the technical phases of the business.

The Joint AGA-EEI Accounting Employee Relations Committee has found that in other than the engineering or technical fields, however, relatively few utility companies have formalized management-development programs. Accordingly, the committee felt that the problem, specifically as it related to selection and training for office management positions, merited study and investigation.

The Problem Today

There are a number of reasons for the present urgency of the development of management employees. The manager's task is becoming more complicated each year. We are all aware of the many technological advances that have been made in the operations of the business and of their effect on our operations. Shifting competitive conditions in the market, customer relations, and labor problems, all add up to greater demands for higher levels of managerial competency in all phases of utility administration. All of these factors directly or indirectly impinge upon customer accounting operations. Beyond this, the continuing rapid rate of expansion of the business is bringing continuing problems of greater import. With this expansion, there is the ever-present need for the development of more efficient procedures, made even more significant by the current high level of labor and other operating costs.

In many companies in the industry, development of management employees has been a natural or automatic process, whereby individuals with ability and ambition advanced slowly, but steadily, to positions of higher responsibility. This process will, of course, continue. But, as job specialization takes place in the future, it will become increasingly difficult for an adequate number of individuals to acquire the broad training and experience needed to qualify themselves readily for higher and broader responsibilities. The scope of jobs, when companies were smaller, gave an individual an opportunity to develop a wider range of abilities. However, particularly in large companies today, an individual's abilities and capacity for development cannot be exercised unless management takes definite steps which will permit them to be exercised.

Program Costs—an Investment

From a very practical point of view, a management-development program represents a capital investment, although it cannot be so treated in an accounting concept. The fact remains that provision must be made for the building of the management team five or ten or more years hence, just as provision must be made for plant expansion. Plans must be made for gradual replacement and reinforcement of the management group.

A management-development program, to be effective, will cost considerable sums of money, year after year. Administrative ability cannot be developed quickly; it involves a long process of growth and expansion. On the other hand, failure to provide adequately for future long-term managerial requirements can bring problems of a serious nature.

Scope of Report

This report outlines the experience of Public Service Electric and Gas Co., which has had a commercial office management-development program in use for over 31 years. Obviously, the requirements and circumstances of individual companies vary quite widely, but it is hoped that a review of this company's experience will be of interest and use to other companies in coping with their own organizational development problems.

Public Service provides electric and gas service in an important industrial and densely populated area in New Jersey, covering a territory approximately 100 miles long and 20 to 30 miles wide, extending diagonally across the state from Jersey City to Camden. It serves over 1,260,000 customers living in communities having a total population of over 3,700,000.

Customer accounting, customer service, meter reading, collection, and other customer activities are handled in 23 district offices and six branch offices, located in the principal cities and towns in the territory served by the company. Customer billing operations are handled in a central billing department.

There are over 13,500 employees in the company, of which over 2,100 are in the commercial department.

Each of the district offices is in charge of a commercial manager, assisted by an assistant commercial manager. The district offices are grouped into six geographical divisions, each under the jurisdiction of a division commercial manager. The entire commercial organization is headed by the general commercial manager, who is assisted by a general office staff.

History of the Program

The Public Service commercial management-development program, referred to as its "Commercial Cadet Training Program," was inaugurated in 1921. Although many changes have been made in the details of the program, the basic principles upon which it was originally established remain the same today.

As originally planned, the program was designed to recruit and train men for various assignments in the financial and commercial departments of the company. Over the years, many cadet graduates have been assigned to departments other than the commercial department, though today the Commercial Cadet Training Program is conducted for the primary purpose of developing manage-

ment employees for the commercial organization. Separate cadet engineering training programs are conducted in the electric and gas operating departments, and a separate sales engineering cadet training program is conducted by the sales department.

The operation of the Commercial Cadet Training Program has served the very important function of bringing into the organization an adequate supply of new blood from colleges at regular intervals, thus providing for a proper age distribution. Through the program, young men have been brought in and have grown with the company through training, management encouragement, and job experience.

The company's promotional policy from the start has been, and still is, that of promotion from within, and the cadet program has served very materially to implement this policy. When the program was initiated in 1921, only college graduates, just out of college, were admitted, and this was continued until 1934. In 1934, however, the basic policy of promotion from within was directly integrated into the cadet training program itself through the adoption of a plan of selecting promising individuals from within the organization for training under the program.

In every year from 1934 to 1951, inclusive, when course assignments have been made, at least one regular employee has qualified for assignment to the course. During this period, a ratio of approximately one individual from the present employee group to two individuals from colleges has been maintained for course assignments.

Elements of the Program

The program, as it is presently administered, consists of four basic elements:

1. Forecasts of management requirements in the commercial organization.
2. Selection of men for assignment to the program.
3. Training procedure.
4. Permanent assignment and control.

Each of these elements of the program is outlined below.

Annual forecasts of management requirements in the commercial organization are prepared for five-year periods. These forecasted requirements are matched against the personnel that will become available in each of the years in the five-year periods. Factors that are considered in these annual forecasts and analyses include such matters as anticipated requirements, estimates of vacancies that will occur for reasons other than retirements, availability of other than graduate cadets, and anticipated changes in operating requirements.

After the forecast has been made and the analysis of the anticipated requirements has been compared with the available personnel, a decision is reached as to the number of new trainees to be assigned to the program during the current year, first consideration being given to present employees.

Eligibility

To be eligible for nomination as a candidate for the commercial cadet training course, a young man already in the employ of the company must, in addition to having a good record as an employee:

1. Be between 21 and 30 years old, both inclusive. (Under certain unusual conditions, the upper limit may be set at somewhat above 30 years.)
2. Have been in the employ of the company continuously for at least three years.
3. Have a good general education. However, no fixed qualifications in the way of formal schooling have been established.

These three specific requirements are subject to minor modifications in any individual case where individual circumstances make it advisable not to adhere strictly to the indicated limitations.

Candidates must, of course, be willing to accept assignment anywhere in the company's territory, both during the training period and afterward.

Candidates for appointment to the course, from among present personnel, are nominated by management in the line organization. An endeavor is made to have one candidate nominated from each of the six field divisions in the commercial organization. The number and distribution of candidates is necessarily affected, however, by the availability of qualified personnel.

The direct administration of the Commercial Cadet Training Program is handled by the director of educational work. He personally interviews all candidates who have been nominated, as the next step in a screening procedure.

College seniors who will earn such degrees as A.B., B.S., or degrees in engineering, and who are interested in work in the public utility field, are interviewed on college campuses by the director of educational work. Factors considered in the selection of such individuals for assignment to the course include the applicant's personality, his scholastic record, his extra-curricular activities, and his promise of ability to lead men. Particular consideration is given to seniors who have taken a number of business courses.

College seniors selected by the director of educational work from those he has interviewed and candidates nominated from within the organization who have been screened by him are then brought in for individual interviews by the general commercial manager and members of his staff. This group makes the final selection of individuals for appointment to the program.

No contract is entered into with the individuals selected. The employment of the cadet may be terminated at any time by the man himself or by the company.

Training Procedure

The Commercial Cadet Training Course is of two years' duration. During this two-year period, the cadet is given an opportunity to observe work in the commercial department, gas distribution department, electric distribution department, sales department, and the general office.

Prior to each individual departmental assignment, the cadet is given a brief orientation by the director of educational work. This discussion covers such information as the broad functions of the particular department, its relationship to other departments, general features as to its subdivisions, and the names of the top personnel in the department.

Upon assignment, discussion of operations and instruction is given to the cadet by the department head and supervisors. The cadet is then assigned to individual non-supervisory employees for purposes of observation and detailed follow-up of the general instructions given by the supervisor. The cadet is also given the opportunity to obtain actual experience through specific work assignments. However, care is taken to insure that these shall not result in loss of time for any regular employee, or loss of opportunity for overtime work or work in a higher classification. Furthermore, cadet work is not allowed to involve the assignment of a less desirable type of work to any regular employee. As an example of cadet work assignments, in the meter reading department, after a period of

time of observation of a meter reader's work in the field, the cadet will take the meter reading book and actually perform the work while in the company of the meter reader.

At the conclusion of each departmental assignment, the cadet is required to prepare a detailed written report covering the operations of the department, based upon his observations. This report is expository in nature, and its purpose is two-fold. First, it is intended to afford the cadet an opportunity to present a review of what has been learned of departmental procedure, and second, it affords an opportunity for him to indicate that he has grasped the broad significance of the particular department's operations.

These departmental reports are carefully reviewed for form and content by the director of educational work, and following this, the reports are then discussed in detail by the director with the individual cadet.

After a cadet has completed his tour of assignment in a department, a confidential rating report on the individual cadet is prepared by the department head. This report is based upon observation of the cadet's performance while assigned to the department. The rating report is designed to provide a performance-rating profile covering the following general characteristics:

1. Ease of learning.
2. Neatness and accuracy.
3. Industriousness.
4. Ability to get along with people.
5. Organizational ability — cooperation.
6. Leadership qualities.

The rating reports are reviewed and discussed frankly by the director of educational work with the individual cadet in order to facilitate the development of the cadet. Periodically, all rating reports on each cadet are correlated, and any rating divergencies which appear to warrant particular attention are investigated by the director of educational work in discussions with the department heads concerned. Subsequent discussions with the cadet are conducted against the background of report correlations and investigations.

At six-month intervals, each cadet is personally interviewed by the general commercial manager and members of his staff, at which time the cadet's progress and development to date are reviewed and discussed. Deficiencies or problems that arise can then be dealt with directly and forthrightly with the cadet. From the cadet's point of view, these periodic interviews serve the purpose of keeping him on the alert at all times during training, for he realizes that he may be questioned in the interview on any phases of his assignments to date. It also serves the salutary purpose of underlining for him management's desire to provide encouragement in his development.

Permanent Assignment

Upon completion of the 104-week training program, the cadet is interviewed again by the general commercial manager and members of his staff, and the matter of permanent assignment is discussed with the cadet. In the permanent placement of a man completing the course, consideration is given to his fitness and preference for various assignments.

Under present operation of the program, a cadet is placed in the reserve pool of graduate cadets and given a temporary assignment in the general commercial manager's general office staff organization for a period of at least one year. In this assignment, he has further opportunity to train and prove his value. During this period, stress is placed upon the development of initiative and self-reliance, characteristics essential to subsequent permanent assignment.

Assignments on a permanent basis to positions either in the field or general office organization are made from the reserve pool as vacancies occur. Progress of the cadet in the company after assignment will depend upon his ability and further development and the competition he encounters in the organization.

Program Results

Over the period of 31 years that the program has been in effect, a substantial number of men have been assigned to and have successfully completed the program. At the present time, 58 graduate cadets are still in the organization, and there are two men currently in training.

Of course, some of the cadets left the company during the training program, either at the company's request or through voluntary resignation. Then too, some of those who completed the training program subsequently resigned from the company. In the past ten years, however, there have been very few resignations, probably reflecting a more thorough screening procedure.

Of the 58 graduate cadets, 37 are currently assigned to various management positions in the commercial organization, 27 are in the field organization, and ten are in the general office staff organization. This latter group includes recent graduates, on temporary assignments, who are in the reserve pool. The other 21 graduate cadets are assigned to management positions in other departments of the company.

Employee reaction to a management-development program can easily become unfavorable, for regular employees may tend to resent the special training and attention accorded individuals in the program. In Public Service, this type of reaction has been, we believe, held to a reasonable minimum because of a number of factors. First, regular employees know that if they have the necessary qualifications they may themselves be considered for assignment to the program. Employees know that when appointments are to be made to the program, first consideration is given to possible selection from within the organization. Another important factor is management's continuing practice of promoting the best qualified employees, whether or not they are graduate cadets, to management positions.

Motivating Philosophy

Eugene R. Grace, Chairman of the Board of the Bethlehem Steel Co., in an address made a number of years ago about training business executives, had this to say:

> We generally find that the man who judges wisely is usually the man who has observed accurately in the first place. He has seen and analyzed correctly that which has passed before him. He has reasoned out in his own mind the relationships of the things which he has seen; he has noticed the effects which have followed from causes which have come under his own observation — and he has seen these things straight. And that is the most difficult thing in the world to do.
>
> If I were to prescribe one process in the training of men which is fundamental to success in any direction, it would be thoroughgoing training in the habit of accurate observation. It is a habit which every one of us should be seeking ever more to perfect.

The Commercial Cadet Training Program enables the cadet to obtain a good general knowledge of the electric and gas utility business and of company opera-

(*Continued on page* 200)

Interviewing Salesmen

By Harold T. Belcher
Purchasing Agent, Consumers Power Company

An address before the Purchasing and Stores Committee, New Orleans, La., May 12, 1952

GONE is the era when the purchasing department maintained its operation in a ruthless manner, for never has good will or friendship been a more important factor in the conduct of business than it is today. A considerable portion of every purchasing agent's time is spent interviewing sales representatives, though, contrary to the belief of some salesmen, interviewing is not the only thing a purchasing agent has to do. Still it is an important part of the procurement job and should be approached in a manner to conserve both the buyer's and seller's time, get maximum results from the interview, and build satisfactory relations with vendors and their representatives.

Facilities for Interviewing

First, let us discuss briefly "interview facilities." In many cases, buyers are located in one large office and callers are interviewed at various desks. This condition is quite unfavorable to a good interview. Arrangement and spacing of desks must be carefully planned so as to give the maximum of privacy to each buyer. Ordinary interviews can be handled under such conditions, but it seems advisable to provide a conference room where more confidential matters may be taken up in private.

If the buyer or purchasing agent has a private office, the furniture arrangement should be considered as important. One prop that is of considerable help is a table to be used as the buyer's working surface, which leaves his desk free for conducting the interview and looking at blueprints or other sales data. This arrangement also keeps confidential papers, which might meet the roving eye, well out of the way.

Many representatives make strictly routine or courtesy calls and become a source of wasted time, serving no constructive purpose other than keeping the names of their companies before the buyer. We have an educational problem here that demands the utmost tact in handling by the purchasing agent. A representative cannot be expected to curtail the number of his calls at the risk of losing business, but if we discourage the casual calls, he will make it a point to have some specific purpose for each visit.

Sales representatives should be announced to the buyer as soon as they arrive in the reception room in order to help the buyer plan his time and schedule the calls ahead. Telephone calls from the receptionist to the buyer are inadequate, and a penciled memorandum from the reception desk is preferred. If the representative cannot be seen at once, he should be advised how long he must wait. If the buyer is going to be busy for a considerable length of time, it might be well to ask to be excused from his present interview for a minute and step out to the reception room to greet the caller and explain the reason for the long delay. The waiting salesman may have other calls he can make in the meantime and may be able to return at a specified time to see the buyer. However you may desire to handle the situation, it is not wise to try to schedule all interviews by appointment. Only the most important interviews which may require a longer time than usual should be set up on an appointment basis.

The regular caller will know whom he ought to see, but a well informed receptionist, one who knows the assignment of buying responsibility within the department, can route callers through the organization properly and save valuable time for both buyers and sales representatives.

Frequently the time spent by a salesman awaiting his turn to see a buyer may amount to more time than is actually spent in the interview. This can result in the formation of ill will between the sales organization and the buyer's company. The buyer, on the other hand, should not waste his own time by prolonging an interview beyond the time required to conclude the business at hand. Both situations, the excessive waiting of a sales representative in the reception room and the unnecessary prolonging of an interview, can be controlled by the buyer, but control must be handled in a tactful manner so that feeling of resentment or frustration are not created and the purpose of an efficient interview thereby defeated.

There are several types of interviews, each with specific objectives. From the standpoint of the sales representative, an interview may be classified into various phases such as exploratory, missionary or informative, a direct sales effort, negotiation, or a service or good will call. Whatever approach may be used at the outset, you can be assured that other successive steps will follow, all incorporated in a general plan to lead eventually to the sale.

On the buyer's side, the objectives more or less coincide with a succession of steps leading to material information, vendor information, selection, negotiation, service facilities, and the goodwill aspect. The buyer's technique must be adapted to these various types of conferences.

Purchasing agents must be prepared to handle efficiently any interview that may occur. We must remember that the sales representative is talking on familiar ground and that his performance has been given many times before. The better representatives spend many hours preparing a presentation. The best sales brains of his organization, plus experiences of many other representatives in many interviews, have gone into the plan of his interview. He has learned to anticipate various questions and objections and is ready with his evidence, answers, and arguments. He has a specific line of materials to sell, and that one line is his job.

Controlling the Interview

On the other hand, the purchasing agent must take his callers as they come. He must be prepared to divert his attention back and forth over a large variety of unrelated topics and materials, and adjust himself to the different stages of negotiation. He must not permit the seller to control the interview. The buyer should avoid getting into a strictly defensive position, and should definitely control the interview in a positive vein. His responsibility is to buy, not to buy whatever might be offered but to get the right material from the right source at the right price and at the right time and to maintain a favorable competitive position with the industry.

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Forecasting Techniques

By Carl E. Sandeen
Middle West Service Company

An address before the EEI Statistical Committee, Hot Springs, Va., February 28, 1952

THERE are some individuals who appear to have very little faith in projections which go beyond one year. These individuals like to pick up an old set of forecasts, which may be two or more years old, compare it with the actual results during that period, and then point out seemingly large differences. However, the set of projections under consideration may have served its purpose very well, since the results thereof may have been within the realm of reasonableness.

I believe that, generally, projections should cover a minimum period of at least three years.

In the preparation of forecasts, it is well to keep in mind the general purposes for which such statements may be used, and I should like to enumerate some of the more important of these purposes.

1. First, and perhaps most important, is that of correlating the future planning of the engineering department with the financial policy of a company.

2. To determine the future financing plans of a company as to type of security to be issued from time to time, so that a balanced capital structure will be maintained and that common dividend policy of a company will not be jeopardized.

3. To determine the soundness of future dividend policy, particularly when consideration is being given by management to an increase in the dividend rate on common stock. It would be almost foolhardy on the part of management to consider increasing a dividend rate without first taking a look at future estimates covering a period of at least three years.

4. Companies which are subject to the Holding Company Act are generally required to file estimates or projections with the SEC in connection with applications for sale of securities and in certain other matters. At this point, estimates represent information readily available to the public and, unless they are reasonably well prepared, may be a source of considerable embarrassment to the company.

5. Estimates are also required in rate studies.

6. Estimates are indispensable in reorganizations and mergers, particularly in mergers of companies where it is necessary to determine the ratio of exchange of the common stock of one company for that of another.

7. They also are indispensable for a smaller company which may be contemplating embarking on a major construction program. I have in mind a small company which may presently be purchasing most of its energy requirements and is now contemplating the construction of its own generating facilities.

The common pitfall in making projections is hurried preparation. The many inaccuracies of such estimates usually result in the preparation of additional sets of amended estimates, the last of which may be no more accurate than the first. In the event any one of such estimates gets into the hands of the public, it may cause considerable embarrassment to management and to those involved in its preparation. Good estimates take considerable time to prepare.

Composite of Ideas and Data

Good estimates cannot be prepared by accountants or statisticians alone, exclusive of other people in the organization. The controller's department probably should supervise the preparation or assembly of the data, but the opinions, ideas, suggestions, and data must come from various officers and department heads and, in particular, from the engineering and sales promotion departments. The engineering and sales promotion departments are usually far ahead of the accounting department in the matter of planning for the future. However, the planning of these departments is only one side of the picture, and the purpose of an estimate is to get a composite picture.

Generally, I believe a good set of projections for the consideration of management and others should consist of the following minimum number of statements:

1. Statement of assumptions.
2. Earnings forecast.
3. Cash forecast.
4. Construction forecast.
5. Projected capitalization.
6. Projection of utility plant and reserve for depreciation.
7. A statement of the estimated bondable expenditures and estimates of requirements under the maintenance and renewal provisions of the indenture.

For the first year, estimates should be prepared in detail by months, and for succeeding years, figures may be trended on an annual basis subject to certain checks. It also may be found desirable to break down the second year by quarterly periods.

I would now like to deal briefly with each of the statements that have been enumerated. Perhaps the most important is the statement of assumptions or basis upon which the projections have been prepared. This statement might better be entitled a statement on the limitations on the use of the projections. This information, I believe, should be appended to every set of projections so that those using it will know how the figures were prepared and what they include and, in addition, should represent a protection to management, as well as to those who prepared the estimates. There are first certain general assumptions which must be made, such as the prevailing economic conditions during the period under review and the allowances made for increases in prices and wages and for future Federal income tax rates. Other assumptions which should be set forth are entirely dependent on the problems of the individual company. A few examples of what I have in mind follow:

1. It may be important to state when a new generating unit is expected to be placed in service. This may affect operating and other costs materially.

2. It may be that during the period under review certain major contracts

for the purchase of fuel, power, or materials may expire. Some assumptions must be made as to anticipated costs under new contracts.

3. Assumptions as to water conditions will have to be made by companies which generate substantial proportions of their power requirements from hydro facilities.

4. It may be that a company anticipates taking on a large new power customer. In such event, it may be important to state specifically the anticipated revenues and kilowatthour sales to such customer in each of the periods under review.

Earnings Forecast

The first statement containing figures is the earnings forecast, which is considered by some as the key statement in projections. This statement must represent the composite of the ideas and suggestions of the various departments and officers of a company. I should now like to outline briefly the method of preparation of some of the detailed data.

The first items in the earnings forecast are those of revenues. This data should be prepared by or under the supervision of the sales promotion department, subject to suggestions from various individuals in the field, such as district managers or other people having somewhat similar responsibilities. Revenues and kilowatthour sales should be prepared by classes of service, and the increase in number of customers during each period under review, increase in kilowatthour sales per customer, increase in revenue per customer, and revenue per kilowatthour should be estimated. From this information, it will be possible to compute total kilowatthour sales and total revenues, which amounts may be checked against trended figures. It will be necessary to consider larger industrial and other similar customers on an individual basis. In order to make an intelligent estimate of power costs, it may be necessary to estimate kilowatthour sales by operating areas, depending upon the location of the generating facilities of a company.

Knowing kilowatthour sales, power costs may be computed. This is largely a job that must be done by the engineering department, since it will develop or have information as to peak loads and the loading on the various generating facilities of a company.

Other production costs, transmission and distribution expenses (operation and maintenance), may be trended subject to consultation and advice of the engineering department as to unusual or nonrecurring items which may have existed in the historical data or which must be taken into consideration in the future period under consideration. The transmission and distribution estimates may be partially checked by comparing the historical costs per mile of line with the costs per mile of line in the estimates.

The undistributed expenses, consisting of customers' accounting and collecting, sales promotion, and administrative and general expenses, may be trended subject to consultation and advice with such individuals as the company president, treasurer, controller, and head of the sales promotion department. If management is contemplating making any changes which may materially affect costs, those preparing the estimates should know about them. The trended figures for customers' accounting and collecting and sales promotion expense may be partially checked by comparing the historical costs per customer with the costs per customer in the estimates in each of the respective periods under review.

Depreciation Provision

The next item is depreciation provision. Increases in the provision for depreciation over current accruals may be determined by applying average depreciation rates for the various functional classes of plant to the estimated net additions during the periods under consideration.

Taxes other than Federal income taxes consist largely of taxes on real estate, pay-roll taxes, and taxes based on revenues, such as gross receipts and franchise taxes. The increase in real estate taxes will be based on the net additions to plant, and the percentage increase in pay-roll taxes should bear a reasonable relationship to the percentage increase in related operating expenses.

Interest and other deductions, preferred dividend requirements, and common dividends are entirely dependent on the securities of the company presently outstanding and those proposed to be outstanding.

No earnings forecast is complete unless there is appended thereto certain ratios, which are necessary in the first instance as a test of the over-all reasonableness of the estimates. They also are required by management in its review. The ratios I have in mind are as follows:

1. Per cent of controllable operating expenses to revenues.
2. Operating ratio.
3. Estimated rate of return.
4. Times interest on long-term debt earned.
5. Times fixed charges and preferred dividends earned.
6. Earnings per share of common stock.
7. Per cent of dividends on common stock to the earnings available therefor.

Cash Forecast

The second statement is the cash forecast. The form which generally appears to be most easily interpreted by management and others is that which shows:

1. Cash and U. S. Government Bonds at the beginning and the end of each period.

2. A section setting forth the cash generated from earnings consisting of retained net income and non-cash charges to earnings, such as depreciation, amortization, and the excess of accruals for taxes and interest over payments therefor.

3. The next section should set forth the anticipated cash proceeds from the sales of securities. Herein should be detailed the type of security proposed to be issued and the date of issue.

4. Deducted from these would be a section setting forth the funds required for construction and for sinking-fund requirements on debt and preferred stock. There also would be included in this section expenditures which may be required for stockpiling of materials and fuels, etc.

The third statement is the construction forecast. Here I have in mind a summary statement consisting of perhaps one to three or four pages, not a detailed construction budget consisting of a large sheaf of papers. On this condensed statement, larger individual construction projects should be listed as funds are required therefor for each of the respective periods under review. The remainder of the construction projects may be grouped by the various functional classes of plant, such as production, transmission, distribution, general and transportation. In addition to the construction forecast, there also should be included a statement of the estimated re-

tirements in each of the periods. All of this information, of course, must come from the engineering department.

The statement reflecting the projection of the capitalization of the company should set forth annually, for each of the periods, the details of the securities outstanding by groupings, such as secured debt, unsecured debt, preferred stock, common stock, the accumulated paid-in and earned surplus, and the per cent of each of the respective groups to the total. This statement is used partially as a test of the reasonableness of the financing assumptions.

The next statement is the projection of utility plant and reserve for depreciation. This statement generally, I believe, should reflect the balance of the plant at the beginning of each year, gross additions, gross retirements, balance of plant at the end of each year, less reserve for depreciation at the end of the year, and net plant at end of year. The statement should also reflect certain ratios, such as the per cent of secured debt and total secured and unsecured debt to total plant and net plant at the end of each period. In addition, the per cent of the reserve for depreciation to the plant at the end of each year should be shown.

The last statement is that of a projection of the estimated bondable expenditures and statement of the maintenance and renewal requirements under the indenture. The form of this statement is, of course, entirely dependent upon the provisions of the indentures of individual companies. The projection of the bondable expenditures and maintenance requirements will reflect the limitations on the issuance of additional secured debt. The statement of the maintenance and renewal requirements may indicate that a company should provide a cushion of available bondable expenditures to take care of future anticipated deficiencies under the maintenance and renewal requirements of the indenture. Unless this cushion is provided, a number of companies will be required, in the not too distant future, to deposit substantial amounts of cash with bond trustees in satisfaction of maintenance deficiencies.

In conclusion, I believe, if satisfactory estimates are to be prepared for the consideration of management and others, they must be prepared carefully. Good estimates take considerable time to prepare, and they should represent the composite of the ideas, opinions, and suggestions of the officers and department heads in an organization.

Wisconsin Public Service Establishes Award for Employee Contributing Most to Customer Relations

TO recognize the Wisconsin Public Service Corp. employee selected each year as having contributed most to the improvement of customer relations, a new award, consisting of a $50 United States Defense Bond and an engraved trophy, has been established by C. R. Phenicie, former Vice President and member of the Board of Directors.

Rules Governing Award

Throughout his career, Mr. Phenicie, now retired after 40 years with Wisconsin Public Service, emphasized the importance of public relations and the good will that can be created through unfailing courtesy to customers. In line with this, he has donated the new award, which will be governed by the following rules:

1. An award, to be known as the C. R. Phenicie Public Relations Award, shall be given annually to the employee of Wisconsin Public Service Corp. and subsidiary who, through uniform and patient courtesy and original and unselfish acts in the service of customers, has contributed most to the improvement of public relations.
2. The award shall consist of a $50 United States Defense Bond and a suitably engraved trophy, which shall become the permanent possession of the winner.
3. Names of candidates for the award, and reasons therefor, shall be submitted by departmental supervisors or district managers to the division managers in which the employees' headquarters are located. Each division manager will send to the chairman of the award committee the names of two outstanding candidates along with supporting data. Recommendations shall be in the hands of the committee 30 days after the close of each calendar year, and the committee shall make its decision within 15 days. The award shall be made by March 1.
4. The award committee shall be appointed by the president of the company and shall consist of a chairman and at least two other members.

The award is available to all employees below the rank of supervisor and is being offered in the hope that it will help make "better customer relations a constant objective of every customer contact."

1951 Edgar Marburg Lecture Published in Booklet Form by ASTM

THE 1951 Edgar Marburg Lecture, *Corrosion Testing,* by Francis L. LaQue, has been published in the form of a 96-page illustrated booklet by the American Society for Testing Materials and is now available.

This informative lecture comprises a survey of corrosion testing programs, many of which have been sponsored by ASTM. Mr. LaQue, an authority on the practical aspects of corrosion phenomena and head of the Corrosion Engineering Section, Development and Research Division, The International Nickel Co., Inc., discusses in the lecture the distinction that must be made between the corrodibility of a material and the protective value of its corrosion products and how these are influenced by both the composition of the material and the incidental conditions of its exposure.

Some of the topics reviewed in the lecture are atmospheric corrosion studies, relations between rust color and corrosion, effects of alloying elements on the resistance of steels and irons to atmospheric corrosion, comparison of atmospheres, and galvanic corrosion. Also discussed are a variety of tests, including acid, accelerated, atmospheric galvanic, salt spray, laboratory total immersion, boiling nitric acid, plant corrosion, paints, etc.; tests in waters; corrosion tests of insect screens; long-time tests of different steels and irons; and effects of position in tests.

Established to promote knowledge of materials, the Edgar Marburg Lectures honor and perpetuate the memory of the first secretary of ASTM. The 1951 lecture, bound with a heavy paper cover, can be obtained from the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa., at $1.50 each.

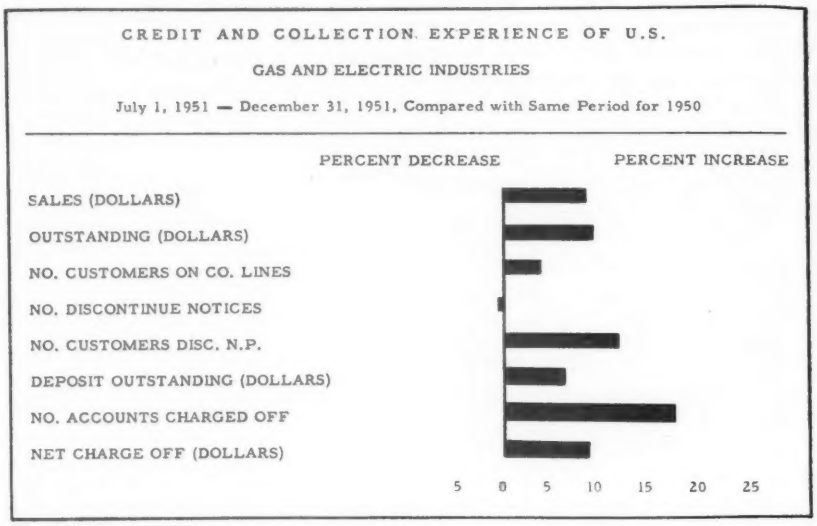
The Credit Picture

Results of a Survey Conducted under the Joint Supervision of the Credit and Collection Committees, EEI Accounting Division and AGA Accounting Section

WHEN two or more utility collection men meet, their conversation quickly turns to the general problem of collections. It seems that they neither tire of the subject nor miss an opportunity to talk shop. They are constantly seeking fresh, first-hand information on methods used and results obtained by others. Are payments lagging in one community more than another? Are better collections the result of better techniques and strategy? What has given the best results?

The Credit Picture is probably the best source of collection statistics available, since gas and electric utility collection men cannot meet whenever they wish to get personally the current information they desire. The Credit Picture fills this need, and the information contained herein is quite comprehensive. It covers the credit and collection experience of a group of 61 companies throughout the United States, serving approximately 38 per cent of the total customers of both the gas and electric industries. This broad coverage provides factual data which enables individual companies to compare their own trends with the combined experience of the reporting utilities.

The chart for the period of July 1 to December 31, 1951, reveals some interesting trends. Dollar sales volume shows a rise, with the last six months of 1951 being 9.5 per cent greater than the same period of 1950. Previous Credit Pictures have indicated consistent increases in sales. Since the gain in customers was only 3.6 per cent, the increase in dollar sales volume was due in large part to increased consumption per customer. This is a healthy sign for any business.


CREDIT AND COLLECTION EXPERIENCE OF U.S.
GAS AND ELECTRIC INDUSTRIES
July 1, 1951 — December 31, 1951, Compared with Same Period for 1950
PERCENT DECREASE
PERCENT INCREASE
SALES (DOLLARS)
OUTSTANDING (DOLLARS)
NO. CUSTOMERS ON CO. LINES
NO. DISCONTINUE NOTICES
NO. CUSTOMERS DISC. N.P.
DEPOSIT OUTSTANDING (DOLLARS)
NO. ACCOUNTS CHARGED OFF
NET CHARGE OFF (DOLLARS)
5 0 5 10 15 20 25

The total accounts receivable balances outstanding for the nine geographic divisions was 10.1 per cent higher than in 1950, which is in direct proportion to the increase in sales volumes. Collection on active accounts showed no change since the ratio of outstanding to sales increased only 0.1 per cent.

While each region and the United States total show an increase in number of customers on the lines, principal rises were registered in the South Atlantic, East South Central, and Mountain States.

The extent of the use of the disconnect notice as a collection media is being given serious consideration by the industry. Changes in policy and experimentation account for wide fluctuations over the country, and there is obviously an earnest attempt to reduce the number of such notices when practicable. Over-all, the increase in the number of discontinue notices sent to our customers was negligible, but there was a substantial increase in the number of customers deprived of service for nonpayment.

In spite of many conflicting opinions about the advisability of accepting deposits and the beginning of a trend away from them, most sections of the country increased their deposit coverage. There appears to be a substantial movement of persons about the country, and some companies which normally do not require residential deposits are finding it necessary to obtain heavy coverage in portions of their territories. The overall picture for the country reflects a 6.4 per cent increase in the dollar balance of deposits outstanding.

An increase in the number of accounts charged off and in the net charge-off does not show a desirable trend. All areas showed an increase in the number of accounts charged off, while all but

(*Continued on page* 208)

CREDIT AND COLLECTION EXPERIENCE OF 61 REPRESENTATIVE UNITED STATES ELECTRIC AND GAS UTILITIES—JULY 1, 1951, TO DECEMBER 31, 1951

Percent—Increase or Decrease over Corresponding Period—1950

	New England	*Middle Atlantic*	*East North Central*	*West North Central*	*South Atlantic*	*East South Central*	*West South Central*	*Mountain States*	*Pacific States*	*United State Total*
Sales (Dollars)	+ 7.1	+ 6.4	+ 5.0	+ 9.7	+11.0	+11.8	+16.7	+14.1	+17.4	+ 9.5
Outstanding (Dollars)	+ 9.2	+ 7.6	+ 0.4	+ 3.1	+10.2	+ 7.5	+21.3	+12.2	+25.2	+10.1
No. Customers on Co. Lines	+ 1.6	+ 1.6	+ 2.6	+ 4.0	+ 6.3	+ 6.1	+ 3.8	+ 6.2	+ 5.5	+ 3.6
No. Discontinue Notices	− 9.0	+11.0	−21.9	+ 7.3	+13.3	+ 1.6	+ 2.1	−14.3	−16.6	− 0.4
No. Customers Disc. N. P.	− 4.8	+27.0	−10.9	+ 1.8	+ 6.6	+53.9	+17.3	+15.7	+10.2	+12.1
Deposit Outstanding (Dollars)	+ 2.3	+ 6.2	− 0.7	+ 0.8	+12.8	+ 8.0	+ 5.1	+ 7.9	−10.3	+ 6.4
No. Accounts Charged Off	+29.5	+19.9	+ 2.9	+21.7	+13.9	+39.7	+24.6	+16.6	+23.2	+17.9
Net Charge Off (Dollars)	+ 7.7	+12.3	+14.8	− 3.8	− 1.7	+60.4	+63.1	+ 3.8	+ 0.9	+ 9.8

Some Practical Aspects of Depreciation Accounting

By Arthur H. Kuhn
Pioneer Service & Engineering Company

An address before the National Conference of Electric and Gas Utility Accountants, New York, N. Y., April 8, 1952

THROUGHOUT the entire history of the public utility industry there seems to have been confusion, fear, and misunderstanding on the subject of depreciation. To a great extent, this came about because of the failure to distinguish between the fundamental principles of "value" and accounting for "cost." When these two entirely different aspects are kept clearly in mind, the element of confusion disappears.

During the past year, serious consideration has been given to this subject by the accountants of both the electric and gas industry because of the proposed revision of the uniform system of accounts by the Committee on Accounts and Statistics of the National Association of Railroad and Utility Commissioners.

Definition of Depreciation

The assignment to review the ideas and comments of the industry and to prepare recommendations and proposed changes to the revised system as related to the subject of depreciation was given to a subcommittee of a Joint Special Committee composed of members of the Edison Electric Institute and the American Gas Association. Early in its deliberations, the subcommittee thought of eliminating any reference to the word "depreciation" throughout the entire proposed revised system. Several recommendations from member companies suggested the substitution of the word "amortization," and other substitute words or phrases were considered. However, in the final analysis it was concluded that since the term "depreciation" had been so universally used, the simplest way to clarify the muddy waters was to properly define depreciation as it was related to accounting and to make it clearly understood that any reference to depreciation in the revised system was related only to the accounting concept and not to the value concept. Working on this premise, the industry committees have proposed the following definition:

> "Depreciation," as used herein, pertains to accounting for depreciation; and as so used means the apportionment to accounting periods of the recorded cost of depreciable plant, less expected net salvage and other recoveries, by regular and systematic charges during the expected useful life of such plant.
>
> Depreciation as so defined is thus distinguished from depreciation as an economic phenomenon, which is the loss in value of property, not restored by current maintenance, resulting from the action of one or more of the factors operating to bring about the ultimate retirement of property from service.

The proposed system of accounts, as revised by the National Association of Railroad and Utility Commissioners committee, defines depreciation as the decline in service value of property and further defines service value of property as its years of service or output during its service life.

It is obvious that depreciation accounting cannot anticipate that the portion of cost allocated to an accounting period represents the decline or change in value which has occurred during that time period. Whether or not the physical plant is actually consumed in service or within a given period of time, the fact remains that ultimately it is retired for one cause or another, and when this occurs, its cost is what has been consumed.

The cost of utility plant with a limited life is a prepaid expense which should be matched or assigned against the revenues of the accounting periods of the useful life of such plant. This matching process is accomplished by depreciation accounting. Depreciation, therefore, as viewed from the accounting concept, is an operating expense, and, as such, comprises one of the elements of cost assignable to revenues. Most operating expenses are incurred on a day-to-day basis, but plant costs are incurred years in advance of the series of services to be rendered. Except for wear and tear and deterioration, plant is not actually consumed in this process. At the end of its service life, it is removed, and its cost (less any recoveries) is what has been consumed during this period of service life, and it is only the allocation of this cost over this time period that concerns the accountant. The economic value of plant at any time during its life of service should be of little or no concern to him, as related to his problem of accounting for the cost of plant.

Perhaps the difficulties experienced to date can be attributed to the fact that the public utility industry as we know it has been going through a period of adolescence and that now it has reached a stage of maturity which brings sounder and more rational thinking.

Essence of Current Thinking

One of the earliest uniform classifications of accounts, which was adopted more than 40 years ago, expresses the essence of the current thinking of utility accountants in this respect in the following extract from the instructions pertaining to depreciation:

> The estimate when required shall be made upon a rule designed to effect by its uniform application during the life of the tangible capital in service a charge into operating expense of the total original cost of such capital, less its salvage or scrap value upon retirement.

Just why, after more than 40 years, we should now be struggling to have the basic meaning of this rule reinstated into a uniform system of accounts seems incredible. The facts in the case are clear. The only real problem which should confront the accountant is that of finding a measuring stick designed to produce a reasonably proper and rational periodical apportionment of plant cost as a charge against revenues.

I was told many years ago, when I

was first being indoctrinated into the academic fundamentals of accounting, that the accountant was a recorder of facts. This might imply that he has rather severe limitations attached to his duties, but adhering to this basic principle, let us examine the facts available to him when he approaches the matter of depreciation. Actually, all he knows with reasonable certainty is the cost of plant installed. The remaining facts that he does not know are:

1. The number of years that the plant will be in service, that is, its service life.
2. The amount of salvage that will be realized when the plant is retired.
3. The cost to remove or dismantle the plant at retirement.

As a consequence, he must make use of the best obtainable estimates of the unknown items prepared with the assistance of technicians and his engineering and operating staffs.

At this point, your attention is called to a document or treatise entitled *Methods of Estimating Utility Plant Life,* which has been prepared under the direction of the Depreciation Accounting Committee of the Edison Electric Institute by its Engineering Subcommittee. The report was in process of preparation over a period of four years from 1946 to 1950, and it has recently been made available to the industry by EEI.

Objectives of Report

The objectives of this report are well stated in the foreword. Briefly, it aims to make available some of the newest techniques for analyzing experience with the retirements of plant units and in applying the knowledge thus obtained to estimates of future service lives. It does not recommend any particular method of depreciation accounting.

Once the accountant has the estimates of service life and recoveries, these become accounting facts which he continues to consider in his process of plant-cost allocation until such time as subsequent studies and estimates may dictate that they be revised.

The report on *Methods of Estimating Utility Plant Life* previously referred to, states in the foreword:

> We would also repeat that this committee believes that if adequate consideration is given to the uncertainties of future obsolescence, inadequacy, and perhaps other functional causes of retirements, future service lives of electric plant units can be estimated only within rather wide margins of error.

The results, therefore, obtained from the use of forecasts must be considered to have a degree of allowable tolerance, and if the best information available, coupled with sound judgment, has been used as the basis of the accounting procedure, the results should be acceptable without serious criticism.

Test of Depreciation Reserve

A test or measure of the depreciation reserve interjects additional factors into the problem, since it is necessary for the accountant, in addition to the facts already at hand, to know the age of the plant and to have an estimate of the type of dispersion. If we accept the simple principle that a test of the reserve is the plant balance less future accruals (adjusted for recoveries), then we have the added uncertainty of the remaining service-life years. Assuming that the average life and age of the plant is a recognized fact, the remaining life becomes a variable factor dependent upon the type of retirement dispersion. This introduces an additional unknown, which might call for a greater degree of allowable tolerance.

Figures published by the Edison Electric Institute on electric utility construction and plant balances indicate that approximately one-half of the plant which will be in existence at the end of this year will have been constructed since the end of the war, and will have an age of approximately two and three-quarter years. Because of this vast construction program, the average age of all utility plant has decreased, since the end of the war, by more than three years. This means that virtually no retirement experience has been encountered on a large percentage of present existing plant, and, therefore, the problem of accounting for plant costs becomes more and more dependent on estimates of the future.

Predictions of Service Life

Who can say that the service life of plant can be predicted to within a degree of exactness measured by a year or two? From available records, it can be said that the general consensus of opinion, on plant in existence today, is that its average service life is twice what the average service life of plant was considered to be 40 years ago. It is true that some of this change can be attributed to the rapid development of the electric industry, which caused much of the earlier plant to be retired after it had been in service a relatively short time. On the other hand, new techniques, developments in standardization, and preservatives are all contributing to longer service lives.

As depreciation accounting studies are made from time to time, it must be borne in mind that such studies are based on current available statistical facts coupled with engineering analysis, judgment, and forecasts of future probabilities, and it would be a rare coincidence if the results were identical with the accounting records. The accountant must realize that a reasonable degree of tolerance must be recognized and that he will accomplish his purpose by adjusting his program of accounting for cost as may appear necessary in order to conform to the findings of the latest study.

The accountant's problem can only be considered to be the recording of accounting data within the limits of the known facts and assumed facts based on the necessary estimates which provide him with all of the factors supporting the formula he uses.

Management Employees

(*Continued from page* 193)

tions. In obtaining this information, Mr. Grace's prescription of training in observation is the method followed.

The basic philosophy of the program is that, through it, the results will accrue to the benefit of both the individual and the company. An individual's responsibility for furthering his own personal improvement clearly rests with him. Public Service realizes that its responsibility is to recognize ability and provide an opportunity in the cadet program to encourage self development. This basic approach provides a favorable climate for the growth of the individual, and the program is deliberately designed to develop growth potentialities of individual cadets. The company's 31 years of experience with the program represent a very substantial investment of time and money, but it is an investment which Public Service believes has brought substantial returns both to the company and to the individual.

Purchasing and Stores Committee Meeting

By R. L. Leach, *Chairman*

SEVENTY-THREE members of the Purchasing and Stores Committee, representing 27 states and the Dominion of Canada, attended the 1952 meeting of the committee at the Hotel Roosevelt, New Orleans, La., May 11-14.

Sunday, May 11, was devoted to meetings of subcommittees. The Executive Committee elected C. F. Ogden as General Chairman for 1952-1953, with C. H. zur Nieden as Vice Chairman for Stores, and J. D. Hogg as Vice Chairman for Purchasing. W. M. Holls was again named Secretary-Treasurer.

Executive Committee Membership

These officers, together with the two immediate past general chairmen, R. L. Leach and H. E. Hodgson, and four representatives elected by the membership at large will constitute the Executive Committee for the coming year. Members-at-large will include C. I. Richards and H. T. Belcher (representing Purchasing personnel) and E. N. Scott and J. B. Thomas (representing Stores personnel).

At a meeting of a Purchasing and Stores subcommittee with representatives of the manufacturers of pole line hardware, agreements were reached which will make the application of the Standard Packaging Program on Pole Line Hardware more workable from the standpoint of the manufacturers.

Formal sessions of the Purchasing and Stores Committee as a whole were opened on Monday, May 12, with an address of welcome by George S. Dinwiddie, President of New Orleans Public Service, Inc. H. T. Belcher presented for his subcommittee a paper on "Interviewing Salesmen," followed by a panel discussion on "Inactive Stocks" in which H. E. Hodgson, B. E. Marley, R. A. Clark, O. H. Aydelotte, and C. H. zur Nieden participated. Subcommittee Chairman T. S. Nickelson acted as moderator.

The luncheon speaker on Monday was Robert Elsasser, business consultant and economist of New Orleans. Drawing on his own background of teaching and business experience, Mr. Elsasser discussed "The Effective Use of Manpower."

The afternoon session of the committee was given over to a report of the Standard Packaging Subcommittee, presented by E. N. Scott in the absence of the Chairman, G. E. Balch, and to a discussion of "Materials Controls and Related Problems." The latter discussion was handled by A. G. Skina, Chief of the Construction Expediting Branch of DEPA, and R. H. Sperreng, Chief of the Minor Requirements Branch of DEPA. After a general discussion of existing controls and a preview of the immediate future insofar as controls are concerned, Mr. Skina and Mr. Sperreng spent some time in answering individual questions from the members present.

The morning session on Tuesday, May 13, was taken up by reports presented by R. P. Snow and R. J. Daniels for their respective subcommittees. The paper presented by Mr. Snow dealt with "Measures of Performance in Purchasing," while Mr. Daniels' report concerned "Mechanical Devices for Handling Materials." Mr. Daniels acted as moderator for the group, and G. A. Delnay, A. B. Zurick, and T. S. Dunstan assisted in the presentation.

At the luncheon on Tuesday, Streuby L. Drumm, Vice President, New Orleans Public Service, Inc., dealt with the subject "Is it Worth Selling?" This address discussed the development of The American Way of Life and the threats to its existence today which, if unchecked, may destroy all that has been accomplished in the past.

The session on Tuesday afternoon was devoted to the presentation of papers dealing with "Unit Man-hour Costs" and "Purchasing Problems Involved in Major Labor and Materials Contracts." The report on "Unit Man-hour Costs" was delivered by W. H. Humberg, in the absence of the subcommittee chairman, R. S. King; and Vincent A. Stace, The Detroit Edison Co., presented the second subject.

The committee sessions were concluded with the annual business meeting of the group.

Presiding Officers

All morning sessions were presided over by C. H. zur Nieden, while the afternoon sessions were conducted by R. L. Leach. On Wednesday, May 14, committee members visited the storerooms and Purchasing Department of New Orleans Public Service, Inc., and several local manufacturing plants.

Transmission and Distribution Committee Meeting

By J. A. Pulsford, *Chairman*

THE Spring Meeting of the Transmission and Distribution Committee was held on May 6-7 at the Edgewater Beach Hotel in Chicago, with 200 members and guests in attendance.

Standards and Specifications

The various subcommittee chairmen outlined activities of the Standards and Specifications Group, sponsored by E. K. Karcher.

W. P. Holben described progress in revision of several line hardware specifications now more than ten years old. Work also is underway on proposed new specifications covering moulding staples, expansion shields for galvanized lag screws and machine bolts, insulated clevises, and single-knob-type wireholders.

F. A. Ashbaugh reported a favorable ballot on TD-100, "Specifications for Full-Length, Non-Pressure Preservative Treatments of Poles," which now will be released for publication. Work is continuing on proposed new specifications for Douglas fir heavy-duty crossarms and braces.

R. J. Palmer announced that T&D Committee members cast favorable ballots on proposed EEI-NEMA street lighting equipment standards for poles; materials, finishes and tests; head and reflector interchangeability; and open reflector mountings. Active progress is being made on the preparation of other standards for luminaire supports, film cutouts, and insulator heads. Still others on lamp ballasts, controllers and relays, and insulating transformers are contemplated.

W. L. Vest, Jr., reported that the Fuse Subcommittee will expand its ac-

tivities to cover extremely slow fuses in the low-current range, cutout interruption ratings, and the use and applications of oil circuit reclosers.

E. K. Karcher announced that a new Subcommittee on Connectors for Underground Cable and Cable Accessories is to be organized.

General Engineering

The General Engineering Group, sponsored by J. W. Anderson, covered numerous subjects. W. C. Phillips noted that the Federal Communications Commission proposes to revise rules governing the Special Emergency Service to permit power companies to install point-to-point radio stations to back up their essential normal communications facilities, both within their own systems and to interconnected companies. Despite the limited amount of equipment available for the 450-mc band, companies were urged to make some use of this band in order to maintain justification for continued allocation of the band for power company use.

J. W. Anderson presented a tabulation of locked rotor currents for room air conditioners being distributed throughout the country in 1952, as reported by ten principal producers and merchandisers. W. R. Bullard described a 110-kv, oil-filled, pipe-type cable failure caused by several gallons of water which had unknowingly contaminated the oil several months before the failure.

Other General Engineering Group subjects were incorporated as a part of the joint session with the Electrical Equipment Committee.

Joint Session

The afternoon of the first day of the meeting was devoted to a joint session with the Electrical Equipment Committee, covering subjects of mutual interest.

R. Powers described planning for the expansion of the Wisconsin Electric Power Co. system, tracing development of the various elements of the system from their beginning to presently projected plans.

C. H. Hoffman discussed general principles in planning kilovar supply and a specific example of their application on the Public Service Electric and Gas Co. system. Prominent conclusions included the desirability of subdividing systems into limited geographical areas for planning supply; the need for reserve margins somewhat larger than those for kilowatts; a first preference for unswitched capacitors on distribution circuits up to stability limits at minimum load, followed by switched capacitors on distribution circuits; and a preference for switched capacitors at substations or even switching stations over synchronous condensers.

J. W. Anderson reported that the AEIC-EEI-NEMA Joint Committee on Motor Starting Currents now is trying to establish acceptable industry rules for 3-phase motors. A motor application manual also is being developed. Subjects currently under discussion by the ACRMA-EEI-NEMA-REMA Joint Committee on Air Conditioning include service voltage ranges, particularly in connection with the application of 220-v, 3-phase motors on both 208- and 240-v systems; problems of phase unbalance on 3-phase systems; availability of both single- and 3-phase ratings for the smaller, integral horsepower air conditioners; and the problems associated with the low operating power factor of air conditioners in regions where air conditioner saturation is high.

P. M. Gentzel presented a film showing the new back-pressure, arm-lift method of artificial respiration.

Overhead Group

The Overhead Group, sponsored by G. H. Fiedler, featured discussion of the chemical treatment of right-of-way and the use of all-aluminum conductors.

F. A. Ashbaugh referred to recent public criticism of the use of chemical treatment of rights-of-way which contended that it mars the beauty of the landscape, poisons wild game, and destroys game cover. He pointed out that the herbicidal treatment commonly used by electric companies ultimately improves appearance of the landscape by removing high weeds and brush and permitting grasses and other low cover to take over. This also actually improves small game cover, and he stated that he knows of no case where 2,4D compounds have killed game. Apparently, many critics confuse herbicides with insecticides or fungicides.

W. P. Sylwester, Extension Botanist of Iowa State College, distributed Agricultural Extension Service Bulletins on the subject; confirmed Mr. Ashbaugh's comments; pointed to many other advantages of chemical treatment of roadsides, such as elimination of traffic and health hazards and conservation of soil; and showed numerous full-color slides showing these improvements.

M. H. Pratt reported that a ballot of T&D members favored adoption of a proposed standard for overhead-type all-aluminum conductor sizes above #4/0, consisting of a scale of copper-equivalent sizes in steps approximating the geometrical progression of the AWG numbered sizes.

C. E. Baugh outlined serious corrosion troubles being experienced with connectors used on aluminum conductors on the Pacific Coast and called attention to the need for immediate investigation of the extent of such trouble. Mr. Baugh's presentation appears on page 185 of this issue of the BULLETIN. H. E. Jung, R. E. Cargill, and J. P. Hayward described similar troubles along the Southern California, Louisiana-Texas, and Southern New Jersey Coasts, respectively. Some trouble was reported in inland locations.

Underground Group

The Underground Group, sponsored by W. M. Penney, offered a wide variety of topics. E. B. Shew presented further details of the performance of high-voltage, paper-insulated cable in 1950. The over-all operating record was in accord with past experience and did not reflect any radical changes in trend. However, the 26 termination troubles attributed to inferior design are the largest number for any one classified cause during the past five years.

J. Bogdanowski presented a paper, prepared jointly with E. Williams, and a full color movie describing a newly developed pressed electric wipe, which culminates a long quest for a simpler method of wiping large lead cable sleeves. Using a straight pre-tinned sleeve, two prefabricated, pre-tinned lead end barriers, flexible bare-wire heaters, and a variable-voltage transformer, this scheme reduces the amount of solder required for an 8-inch branch joint from 27 to 1 lb, saves considerable field time, improves safety of operation, and produces more uniformly tight seals.

R. H. Travers presented a paper, prepared jointly with H. E. Nerhood, S. M. Seidman, and L. Horvath, reviewing the complex problems encountered when trolley-bus systems are converted to uni-grounded operation. Although corrosion problems due to stray currents are removed, others arise due to removal of the cathodic protection provided by the former multigrounded system. Nevertheless, after solution of problems encountered at the time of conversion,

the uni-grounded system is very satisfactory and does not require as much attention as the former street-car or multigrounded trolley-bus systems.

W. J. Witte discussed experience with street-car and trolley-bus systems in Baltimore.

T. C. Duncan described the results of tests conducted prior to the installation of 350-mcm all-aluminum cable for network mains in Brooklyn. Aside from fitting the larger aluminum cable into the existing conduit system, the most serious problem is providing splices which can withstand the 250-C temperatures which may be produced by fault currents. Solder, aluminum castings, the Alutherm process, and welding all have disadvantages, and the compression-type joint appears to be the simplest and most promising. Three indentations of carefully selected type and depth on each end of aluminum sleeves are being used in this installation. Most aluminum-to-copper connections utilize a prefabricated crab joint made of aluminum and copper tubing riveted and soldered or brazed together and covered with molded rubber.

T. J. Brosnan, L. W. Clark, J. A. Pulsford, and E. C. Rue also discussed trials of aluminum cable in various underground applications.

J. J. Pokorny presented a study of means for determining the current carrying capacity of insulated aluminum cables.

Hydraulic Power Committee Meeting

By Hibbert Hill, *Chairman*

THE annual meeting of the Hydraulic Power Committee was held in Chicago on May 6-7 at the Edgewater Beach Hotel. Twenty-four members and guests were in attendance at the sessions, which featured 12 papers and a round table discussion period. The group participated in a luncheon of the Joint Engineering Committees at noon of the first day.

Maintenance Problems

P. M. Lefever presented a paper entitled "Interesting Maintenance Problems at a Typical Medium-Head Hydro-Electric Plant," which detailed some of the outstanding maintenance problems encountered recently at the Conowingo Plant of the Philadelphia Electric Co. Mr. Lefever described how the extensive river trash of the Susquehanna is handled and disposed of at this station and how a masonry tailrace retaining wall was replaced after collapsing. He also related how several concrete repairs had been effected at Conowingo.

An informative paper was presented by B. J. Fletcher, Aluminum Co. of America, on the cleaning of the tunnels of the Santeetlah hydroelectric development of the Carolina Aluminum Co. Soon after this project was placed in service in 1928 a dark, greasy deposit began to form on the inside of the five-mile conduit. This fouling gradually increased until it represented a power loss calculated at approximately $20,000 per year. The deposit was found to be a combination of an organic matrix and mineral matter and was removed by washing the conduit interior with water at approximately 125 psi, played upon the fouled surfaces by standard fire nozzles and hoses. The cleaning reduced the conduit head loss by 20.6 ft.

P. M. Hess described problems that had been experienced at the Safe Harbor Plant with the blade bushings of a 42,500-hp Kaplan turbine. The 220-in. diameter runner was removed and shipped by rail to the shops of the manufacturer for repairing.

A paper by Roger Ley summarized a study that had been conducted to ascertain the system capacity of the Western Massachusetts Electric Co. Since the hydro sites of this company are developed beyond the point where the annual inflow can be used continuously at full gate, the determination of the over-all system capacity is an interesting problem in scheduling peaking hydro capacity. The presentation was accompanied by illustrated slides of curves showing the methods of allocation used for maximum peaking.

The policies of the Southern California Edison Co. concerning the inspection and maintenance of hydroelectric units were discussed in a paper by A. C. Werden, Jr., which detailed the company's practices and pointed out how current maintenance procedures have been developed. Mr. Werden concluded that the company's basic philosophy in this regard is to start with a good, conservative maintenance program and to expand it as experience and accumulated information may warrant.

A particularly interesting feature of the meeting was an illustrated discussion on the proposed Niagara redevelopment project. E. B. Strowger traced the history of power development at the falls on both the Canadian and American sides of the Niagara River and advised the group of the supplementary hydroelectric capacity that will be installed by a group of power companies if Congress approves private development of the project.

Pitting Experiences Reported

R. R. Randolph, Jr., presented an informative report of the Cavitation Subcommittee entitled "Pitting Experiences of Hydraulic Turbines," which has been prepared from completed questionnaires. It is interesting to note that approximately 84 per cent of the hydraulic turbines installed in the country are pitting to one degree or another. The report concluded that if these pitting tendencies could be reduced, a resultant improvement in turbine efficiency over the 90 per cent which has been generally accepted for the past 35 years might possibly be realized.

A report on the Kansas floods of 1951 and 1952 was given by S. J. Vincell. This presentation, illustrated by slides, detailed the extent of the contributing causes and explained that while the 1951 flood resulted from prolonged rainfall, the 1952 flood was caused by the melting of snow by unseasonable weather.

S. Moyer, Philadelphia Electric Company, discussed the organization and activities of DEPA. Mr. Moyer is currently associated with the Generation Section of the latter organization.

Round-Table Discussions

The afternoon of the second day was devoted primarily to round-table discussion topics. Included among the subjects discussed from the floor were spillway-design flood determinations, insulating ice coats to prevent freezing of steel penstocks, sand and silt abrasion, and modern design of sluice and tainter gates and methods of heating. A feature of the afternoon was a prepared discussion by E. B. Strowger on design of inlet and discharge tunnels for steam plants.

Prime Movers Committee Meeting

By G. V. Williamson, *Chairman*

IN conjunction with the recent Engineering Committee Conference, the Prime Movers Committee convened on May 5 and 6 at the Edgewater Beach Hotel in Chicago. This occasion afforded an opportunity for a joint meeting with the Electrical Equipment Committee on the afternoon of the first day. Eighty-one members and guests participated in the Prime Movers Committee sessions.

The first action of the meeting was to review subcommittee activities. T. Finnegan of the Power Station Chemistry Subcommittee reported that the problem of iron-oxide deposition is being studied by his group. In an effort to define the problem and to determine the extent of difficulties occasioned by iron oxide, particularly in control valves and mechanisms, a questionnaire has been sent out. It is expected that the results of the questionnaire will be available during the summer.

The Power Station Data Subcommittee, under the chairmanship of R. P. Moore, reported that 23 data sheets had been distributed since the February meeting of the committee. Three more of these reports are being processed at the present time.

The Metallurgy and Piping Subcommittee is currently preparing a report based on the results of a recent questionnaire. E. H. Krieg, Chairman of this group, stated that the report will indicate how actual, superheated, steam-piping pressure drops compare with computed values by standard formulae. The report will also summarize the practices followed by various companies in determining the combined stresses in cold-springing piping and experiences with "blue blush" on control-valve parts.

The two-day meeting period proved inadequate for a round-table consideration of all of the more than 90 topics that had been submitted for discussion. Because of the importance of this committee activity, a maximum time was, however, allotted to round-table questions, with remaining subjects being scheduled for the October meeting of the group. J. M. Driscoll conducted this portion of the program.

Several trouble reports were cited which involved equipment common to many power generating stations. Two companies referred to recent tube failures in pendent-type superheaters. Similar experiences have caused several companies to reduce the firing rates on bringing boilers up to steaming conditions and to investigate various alloys for boiler tube service.

A report was given on a 40,000-kw turbine unit that suffered a cracked nozzle block. Semi-circular pieces had broken out of several partitions under a valve part, and severe cracks were observed. Several radial crush pins were also severely deformed, and details of the repair procedure were described.

Several trouble cases due to cracks occurring in high-pressure valves were discussed. In some instances, faulty valves have occasioned forced outages. One company recently replaced a large throttle-valve casting with a forged body to prevent recurrence of this trouble.

One company reported on alterations and repairs effected on a turbine-generator to increase its operating performance. The reduced efficiency was due in part to excessive leakage through the high-pressure steam packing. Repairs to this unit will occasion an outage of approximately two months.

One recently built power plant has experienced difficulties with dust collectors due to certain parts of the equipment being severely eroded by particle-laden gasses. The manufacturers of the apparatus are cooperating with the operating company in resolving the difficulty. Discussion of the problem indicated that similar problems have been experienced by other electric companies. Remedies that have proved effective in some instances were described by several members of the committee.

Other subjects considered by the meeting included paints for outdoor stations and corrosion of outdoor boiler casings, piping insulation, rust prevention of valve parts during storage, hydrogen storage, and the deposition of iron oxide on control-valve parts.

On the afternoon of the first day, the Prime Movers and Electrical Equipment Committees convened jointly in the hotel ballroom. A panel composed of C. W. E. Clarke, P. M. Ewart, E. H. Krieg, E. E. Taylor, and H. L. Lowe discussed the subject of power-plant instrumentation, with C. C. Farrell serving as moderator. Slide illustrations accompanied the presentations of each of the panel members. The discussions indicated the extent to which functional design is being incorporated in plant panel boards. Several companies prepare mock boards for new stations before actual installations are made in order to locate instruments where they can be readily observed or manipulated by operators. In panel-board layout, consideration is also given to appropriate lighting of instrument dials, proper grouping, and optimum utilization of space. Instrument manufacturers are assisting in the improvement of control-room panels by designing instruments with easily read scales.

An opportunity was extended to members of the combined group to question panel members after the presentations.

Management's View of the Power Sales Job

(*Continued from page* 182)

one from our viewpoint. By showing that electric power costs represented only about 1 per cent of manufacturing costs in the textile industry, it was possible to demonstrate quite effectively that high electric rates were not responsible for the situation that existed then and still exists today.

There is a great deal more that can be said about this subject, but I think it is time to summarize what I have been driving at by making three brief points:

1. The electric utility industry is engaged in a serious battle for self preservation against the advocates of government ownership. We believe that our battle is part of a broader battle for the preservation of our system of private enterprise against encroaching socialism, which is a threat to the entire economy of this country.

2. We cannot expect a sympathetic hearing by the public unless the public feels that its interest and ours coincide. The proof of that lies in how we carry on our day-to-day business and how we, as companies and as individuals, fulfill our responsibilities as citizens in our respective communities.

3. Industrial power representatives are particularly well fitted by training, experience and general outlook to play a significantly important part in attaining the objective. There is a great opportunity for us all in this field and I hope that we will not fail to take advantage of it.

Farmer's Problems

(*Continued from page* 184)

tion per man-hour on farms since 1910-14? Figures available from USDA show that total production of all crops and livestock in 1950 was twice as high per man-hour as before World War I. But crop production per man-hour was two and one-half times the 1910-14 level, while livestock production was only one and one-half times the same level. In other words, crop production has become much more efficient in the use of labor than has livestock production. For example, the amount of labor required to produce a bushel of wheat and of corn (two of our most mechanized crops) has decreased 70 per cent and 65 per cent, respectively, in the last 40 years, whereas the amount of labor required to produce a hundredweight of milk or a hundredweight of market hogs has decreased only 25 per cent.

What has happened is that field work on crops has become much more mechanized than has barn work on livestock. Certainly, crop production is not yet as fully mechanized as it will be, but the bigger opportunity right now is a fuller mechanization of farm buildings. In fact, if this is not accomplished, livestock production will be still further penalized in competition with crops. This is where I would say that rural electric companies still have a big opportunity.

Are all your customers now making the fullest economical use of lighting? heating? cooling? freezing? ventilation? pumping? brooding? conveying heavy materials, such as hay, grain, silage, manure, etc? crop drying? and the many other uses of the cheapest-of-all-hired-hands that a good sales engineer can dream up? Every task that can be shifted to a low-cost kilowatt saves high-cost labor. Are electric companies doing enough work directly with farmers in promoting a fuller use of this cheapest, most versatile, and most dependable source of power? Only the companies can answer these questions, and I neither can nor should.

Of course, anyone might ask why, if electricity is so good for the farmer, doesn't he get it for himself without having to be sold on it? The same question is valid with respect to any other useful product or service available to any potential customer. But the whole American economy is a tribute to the fact that it is the aggressive seller and honest renderer of service who gets the market and the profits. At least that always has been true, and we had better keep it that way.

To the degree that electric companies can contribute to more efficient farming —and I think that they can contribute enormously—they are helping to meet the problem of high farming costs right where it does the most good. No one knows whether recession or continued boom is directly ahead of us. Undiminished boom cannot go on forever, and when recession comes, as inevitably it will, the most efficient farmer will best weather the storm. In the interim, and at all times, ever more efficient farming is the best way to assure us an expanding food supply to meet the needs of our rapidly growing population.

Officers Elected and Contest Winners Announced at Annual PUAA Convention

INCLUDING the election of officers and the announcement of winners of the 1952 Better Copy Contest, the 31st Annual Convention of the Public Utilities Advertising Association was held in the Radisson Hotel, Minneapolis, Minn., on May 8-9. Named President of PUAA for the coming year was Paul L. Penfield, Advertising Manager of The Detroit Edison Co., succeeding John E. Canfield, Vice President of the Wisconsin Power and Light Co.

Other officers elected were Walter G. Heren, Union Electric Co. of Missouri, as First Vice President; C. Fred Westin, Public Service Electric and Gas Co., as Second Vice President; Charles D. Lyon, Potomac Edison Co., as Third Vice President; George Hanel, Connecticut Light & Power Co., as Secretary; and Mead Schenk, Interstate Power Co., as Treasurer.

Mr. Penfield, the new PUAA head, has had a varied career which includes teaching school, from 1923 to 1925, in the city of Changsha in the Hunan Province of south-central China. Beginning in 1926, he spent three years with George Harrison Phelps, Inc., a Detroit advertising concern, and in 1929 established an electrical appliance firm, Campbell-Penfield, Inc., in Detroit. He remained with the latter company until 1939, when he joined Detroit Edison in the commercial office division, rising to his present position in 1945.

The 1952 judging of the Better Copy Contest marked the contest's 29th consecutive year of operation, believed to be a record in consecutive competitions in the advertising field. Entries were judged in 58 classes covering virtually every media of advertising and public information.

Among the speakers at the two-day conference were Allen S. King, Executive Vice President of the Northern States Power Co.; E. Carl Sorby, Vice President of the George D. Roper Corp.; R. D. Furber, Director of Advertising and Public Information for the Northern States Power Co.; and Orville E. Reed, house organ publisher.

Mr. King, in an address welcoming convention delegates, stated that the industry should be confident of its ability to surpass its previous high records of accomplishment and "confident that neither the government, nor anyone else, can take away from us the opportunity of developing . . . as long as we do our job well, make our customers like us, and discharge our obligations of citizenship to the territories we serve."

Speaking on "What Price Power from the Missouri," Mr. Furber discussed factors contributing to public misunderstanding of Missouri River development. He pointed out that "(1) There never has been any real power shortage in this area, and there is none now; (2) all REA cooperatives within this four-state area have electric service and could continue to receive service from their present suppliers; (3) over 90 per cent of the farms in this area, and 74 per cent in the two Dakotas, now have electric service; (4) the Bureau of Reclamation rate of 5.5 mills is a subsidized rate, and if economics had to operate for the government as it does for electric utilities, this rate would be about double what it is; (5) last year NSP taxes alone amounted to 6.1 mills per kwh sold, compared to the government 5.5-mill rate for firm energy; (6) the preference clause is the one force that overbalances economics. All customers within the reach of Missouri power projects should be preference customers, because all customers support the projects with taxes. The preference clause actually discriminates between ultimate consumers and not between suppliers."

PERSONALS

CHARLES P. CRANE, President of the Consolidated Gas Electric Light and Power of Baltimore, who served last year as a Director of the Maryland Utilities Association, has been reelected a Director at the 1952 Annual Association Conference, held recently at the Lord Baltimore Hotel. Austin E. Penn, Vice President of the same company, has been reelected Association Treasurer.

LESTER M. LAPORTE, Controller of Wisconsin Electric Power Co. since 1941, has been advanced to Vice President and Controller, in which post he will continue to head the company's accounting department.

Mr. LaPorte joined the company in 1920 as an accountant, after employment with industrial firms and service in the Army in World War I. He was named auditor of customers accounts in 1925 and assistant secretary and assistant treasurer in 1932.

He has been active in EEI committee work, serving at present as a member of the Accounting Division Executive Committee and the General Accounting Committee. As a member of the Controllers Institute of America, he held the post of president of the Milwaukee control in 1948 and has been a Director since 1943.

HOWARD W. COOPER, Assistant to the President of the Minnesota Power & Light Co., has been elected a Vice President of the company and will continue in his former capacity as presidential assistant.

An electrical engineering graduate of Oregon State Agricultural College, Mr. Cooper was associated with Pacific Power & Light Co., The Washington Water Power Co., Wisconsin Power & Light Co. as vice president, and Central Power and Light Co. as operating vice president before joining Minnesota Power & Light in 1940.

DON B. POTTER and H. O. SPRINKLE have been elected Vice President and Assistant to the Executive Vice President, respectively, of Monongahela Power Co. Both men will continue to be on the staff of the executive vice president, C. H. Heatham.

Mr. Potter started with the company in 1929 and became assistant to the executive vice president in 1950, in which position he was in charge of generation.

Mr. Sprinkle, who has been associated with Monongahela Power since 1930, has been manager of operations since 1938.

EARL J. DYESS has been named Vice President of Southwestern Gas and Electric Co. A veteran of 27 years' service with Southwestern and its predecessor, Mr. Dyess will continue to serve as Fayetteville division manager.

He joined East Texas Public Service in 1925 as an electrician, headed substation and switchboard construction and maintenance in 1927, and was transferred to the general engineering department in 1929. He held increasingly responsible jobs in the engineering field until he was promoted to Fayetteville division manager in 1943.

W. F. MAINGUY, Vice President of Distribution of the Shawinigan Water & Power Co., has been elected Executive Vice President. Joining the Power Engineering Co. in 1928, which was later merged with Shawinigan Engineering Co., Ltd., Mr. Mainguy transferred to Shawinigan Water & Power in 1932, serving first in the commercial and distribution department. He became personnel manager in 1943 and vice president in 1947.

B. C. RUSSELL, General Superintendent of the Idaho Power Co. since 1944, has been elected a Vice President. A veteran of more than 40 years' service with Idaho Power and a predecessor company, he will continue to superintend the operating departments in his new position. He was named assistant superintendent of power in 1919, superintendent of power in 1921, and assistant general superintendent in 1943.

RALPH S. BELL, prominent for 32 years in the field of public uitlity merchandising, has retired as Director of Merchandising Consultation for Commonwealth Services, Inc.

An electrical engineering graduate of the University of Toronto in 1913, Mr. Bell served in the Canadian Army between 1916 and 1919, part of this time in Russia. His first association with public utility work in the United States began in 1919 when he joined the Northern Ohio Traction & Light Co., now the Ohio Edison Co., and since 1920 he has been in executive merchandising positions with Commonwealth Services and its predecessor companies.

Active for many years in the work of the American Gas Association, National Electrical Manufacturers Association, and Gas Appliance Manufacturers Association, Mr. Bell has also served as chairman of the EEI Sales Personnel and Training Committee.

JOSIAH V. COLLEY and SAMUEL J. SCHIML have been elected Treasurer and Comptroller, respectively, of The Dayton Power and Light Co.

The new treasurer joined Dayton Power and Light in 1922 as a clerk in the customer accounting department. From 1939 until 1946 he served as treasurer of the Binghamton group of the Columbia System and as treasurer of the Pittsburgh division of the Columbia Gas & Electric Corp. He returned to Dayton in 1946 as comptroller.

Mr. Schiml has been with the company since 1927 and has served as assistant comptroller since 1950.

ED P. HAFERS has been named Manager of Rates and New Business, in charge of rates, commercial and industrial lighting, and industrial power sales, for the South Carolina Electric & Gas Co. Mr. Hafers joined the South Carolina Power Co. immediately after his graduation from Clemson College. He has served successively as lighting engineer, power sales engineer, and manager of rates and industrial power for the former power company. Early this year he was appointed to his present position with South Carolina Electric & Gas.

FRANK C. PESVEYC, Sales Promotion Manager of Public Service Electric and Gas Co., has been presented the Thomas N. McCarter Electric Award, consisting of a medal and certificate given annually to the employee in the company's electric department who has contributed most during the year to the efficiency and progress of the department.

According to the citation, Mr. Pesveyc received the award "for his outstanding work in promoting good customer, good dealer, and good employee relations. His appearances before associations and service clubs, his participation in association

work, and his wholehearted efforts in support of charitable campaigns have redounded to this company's benefit."

Mr. Pesveyc, who completed 25 years with the company last year, became assistant to the general merchandising representative in 1937, general sales promotion representative in 1941, and was named to his present position in 1947. For three years he was chairman of the EEI Television Committee.

JACKSON HOAGLAND, Adequate Wiring Specialist for the Arizona Public Service Co., has been named Sales Promotion and Advertising Manager, having served with Central Arizona Light & Power Co., recently merged into Arizona Public Service, since 1949. He succeeds A. W. SMITH, who has resigned after 18 years with Capalco to accept a position with the sales staff of Ebasco Services Inc.

Alex Dow Awards Presented to Five Detroit Edison Employees

NAMED in honor of the industry pioneer who headed The Detroit Edison Co. for 28 years, Alex Dow Awards for outstanding achievement and merit were presented to five Detroit Edison employees recently at a banquet held in Detroit's Statler Hotel. The presentations were made by Walker L. Cisler, President of the company.

This year's winners were Frank M. Duff, Electrical Laboratory Supervisor; Virgil K. Rowland, Accounting Personnel Assistant; Charles E. Shelley, Overhead Lines Foreman; Warwick L. Sutton, district sales employee; and Ben B. Tolot, a member of the company's construction department. Each received a citation, a gold lapel pin, an engraved watch, and five shares of Detroit Edison stock.

Three of the award recipients, all from Detroit, were honored for special engineering or administrative achievements, as follows: Mr. Duff, for inventing an instrument that hunts out grounded electrical circuits; Mr. Rowland, for initiating a new plan for appraisal and development of managerial ability in employees; and Mr. Tolot, for devising a mechanism that automatically keeps heavy conveyor belts from running out of line.

Mr. Sutton and Mr. Shelley, both from Ann Arbor, were cited for lifesaving. Mr. Sutton rescued one boy from drowning and helped save two others, and Mr. Shelley applied artificial respiration which saved the life of a lineman paralyzed by severe electric shock.

Interviewing Salesmen

(*Continued from page* 194)

The buyer should always be in position to direct the course of the interview along some defined lines of attack and to obtain the answers to the following:

1. *Material Information*
   a. Does the material fit our requirement?
   b. What about the quality of material offered?
   c. Are there any special advantages in using this material instead of others which are available?
2. *Manufacturers' Information*
   a. Is this vendor a satisfactory source of supply as to equipment, experience, capacity, and character?
   b. Are there any special advantages in dealing with this supplier?
   c. How important is our company's business to this supplier?

An outline such as this will guide the discussion, and, by having these various points definitely in mind, the buyer can assure himself that no essential factors have been omitted.

What do we expect to accomplish in an interview? Naturally there are two viewpoints to be considered in every interview, that of the buyer and that of the seller. These viewpoints are not necessarily antagonistic. Actually the whole relationship of an interview is aimed at a meeting of the minds. The sales representative wants to win a customer and make a sale, while the objective of the buyer may be to develop a satisfactory source of supply or to procure a specific item. This seems to point out that the buyer and seller have a mutual aim.

Many times the buyer is not in the market, may be covered by existing contracts, or may have other current sources of supply for the materials offered. Nevertheless, even where no immediate purchase is to be considered, it is still important to foster and maintain good will because you may want to create a business relationship to be used at some future time. But if the vendor's products do not apply to your business, do not waste your time nor the vendor's time by permitting succeeding interviews with no useful end in view. Still the factors of courtesy and creation of good will should not be overlooked. The reputation for a lack of courteous and considerate dealing travels fast and far in business circles.

(*Continued on next page*)

Vision in Power

(*Continued from page* 179)

problem recently placed before it as a result of our expanding defense effort that in the power field, at any rate, has never before been even remotely approached from the standpoint of size, complexity, and multiplicity of ramifications. I have participated, over the past six weeks, in a great many discussions in an attempt to work out a solution. Almost every new discussion reveals a number of new facets of the problem; this in turn presents invitations to go off on attractive by-paths. The number of these would seem to be almost inexhaustible. But the solution of the problem does not lie in exploration of any of these by-paths. If the problem is not visualized in its whole, and all its parts placed in the context of the whole, the solution as a whole will most certainly be exasperatingly difficult and, perhaps, impossible.

It seems to me that the same basic relationships apply to and govern all other fundamental problems of the power industry. If, on top of its achievements as a social-economic force operating in a complex technical field, the industry can maintain vision, all will be well. The day it loses vision will be a sad day for the industry. And, considering the great importance of power and the contributions that private enterprise functioning in power has made and can continue to make to the welfare of the country, it would be a sad day for the country as well.

As buyers, we often find ourselves charged with the responsibility to do some persuading or "selling" on our own part. We must know the tricks of the trade, how to use them, and how to combat them. Eye control is important. Never look your listener in the eye. Look at the bridge of his nose between his eyes. This is easier, produces the same effect, and you are less apt to blink your eyes or shift them, thus distracting your listener's attention. When you find yourself on the defensive in conversation, look the speaker straight in the lips. By so doing you concentrate on what he has to say, give him a fair hearing, but you cannot be influenced by eye control or facial expression. Another advantage in controlling an interview can be created by standing, or sitting, with your back to the light. This gives you a decided advantage in talking. Also, try to keep your listener seated, preferably in a deep cushioned chair. Devices such as these work both ways; so our job is necessarily the control of the situation.

In conclusion, the sales representative has not done a job for his company or completed his mission for the day if he does not ask for the order. It is his duty to ask for the order; his whole effort leads up to this climax. Likewise the purchasing agent must seek and ask for every legitimate commercial advantage to which his company is entitled. The interview should conclude on a note of confidence and courtesy, the basic requirements for a satisfactory business relationship.

Credit Picture

(*Continued from page* 198)

two showed an increase in the net charge-off.

An over-all look at the Credit Picture for this period reveals several significant factors and trends that should serve to prevent us from becoming complacent. Despite generally rising business conditions, full employment, and higher salaries, final bill losses on gas and electric service accounts have gone up. In our opinion the increases in the number of customers discontinued for non-payment, the number of accounts charged off, and, most important, the final net charge-off, should all serve as straws in the wind for the alert credit man.

CONVENTIONS AND MEETINGS

1952

JUNE

2 PIP Steering Committee, Statler Hotel, Cleveland, Ohio.

2 EEI Industrial Relations Committee, in conjunction with EEI Annual Convention, Cleveland, Ohio.

2-4 EEI 20TH ANNUAL CONVENTION, Cleveland, Ohio.

6-7 1952 Annual South Dakota All-Electric Industry Conference, Alex Johnson Hotel, Rapid City, S. D.

8-12 National Association of Electrical Distributors, 44th Annual Convention, Atlantic City, N. J.

8-12 Canadian Gas Association Annual Meeting, Chateau Frontenac, Quebec, Que.

10 NARUC Accounts and Statistics Committee, Hotel Benjamin Franklin, Philadelphia, Pa.

11-13 Pacific Coast Electrical Association Annual Convention, Hotel del Coronado, Coronado, Calif.

15-19 ASME Semi-Annual Meeting, Sheraton Gibson Hotel, Cincinnati, Ohio.

16-20 ASCE, Denver Convention, Denver, Colo.

19-20 IES Regional Conference, Hotel Preston, Swampscott, Mass.

19-21 ASME Applied Mechanics Division Conference, Pennsylvania State College, State College, Pa.

22-25 Michigan Electric Light Association, Annual Convention, Mackinac Island, Mich.

23-27 AIEE Summer General Meeting, Hotel Nicollet, Minneapolis, Minn.

23-27 American Society for Testing Materials, Annual Meeting, 50th Anniversary, Hotels Statler and New Yorker, New York, N. Y.

23-27 ASME Oil and Gas Power Division Conference, Hotel Statler, Buffalo, N. Y.

26-28 ASME Second Western Meeting of Applied Mechanics Division, University of California, Los Angeles, Calif.

30-July 2 Canadian Electrical Association Annual Convention, Banff Springs Hotel, Banff, Alba.

AUGUST

19-22 AIEE Pacific General Meeting, Phoenix, Ariz.

1952

SEPTEMBER

3-13 American Society of Civil Engineers, Centennial Celebration, Chicago, Ill.

5-6 Maryland Utilities Association, Cavalier Hotel, Virginia Beach, Va.

7-10 Rocky Mountain Electrical League Fall Convention, Colorado Hotel, Glenwood Springs, Colo.

8-11 ASME Fall Meeting, Sheraton Hotel, Chicago, Ill.

8-12 Illuminating Engineering Society National Technical Conference, Edgewater Beach Hotel, Chicago, Ill.

15-16 EEI Accident Prevention Committee, Sheraton Hotel, Rochester, N. Y.

18-19 PIP Annual Workshop Conference, Edgewater Beach Hotel, Chicago, Ill.

19-20 Public Utilities Association of the Virginias, Greenbrier Hotel, White Sulphur Springs, West Va.

OCTOBER

1-3 Wisconsin Utilities Association Convention of Technical and Sales Sections, Schroeder Hotel, Milwaukee, Wis.

5-8 Controllers Institute of America, Annual Meeting, Hotels Sheraton, Cadillac and Statler, Detroit, Mich.

6-7 EEI Prime Movers Committee, Roosevelt Hotel, New Orleans, La.

6-8 EEI-AEIC Joint Meeting, Meter and Service Committees, Mayflower Hotel, Washington, D. C.

13-14 EEI Electrical Equipment Committee, Roosevelt Hotel, New York, N. Y.

13-17 AIEE Fall General Meeting, New Orleans, La.

23-24 EEI Transmission and Distribution Committee, Hotel Adolphus, Dallas, Tex.

27-30 AGA Annual Convention, Atlantic City, N. J.

30-31 EEI-AGA Taxation Committee, Closed Meeting, Chalfonte Haddon Hall, Atlantic City, N. J.

NOVEMBER

10-13 NEMA Annual Meeting, Haddon Hall Hotel, Atlantic City, N. J.

10-13 NARUC Annual Meeting, Little Rock, Ark.

17-19 EEI Industrial Relations Committee, Annual Fall Round Table Conference, Sheraton Hotel, St. Louis, Mo.

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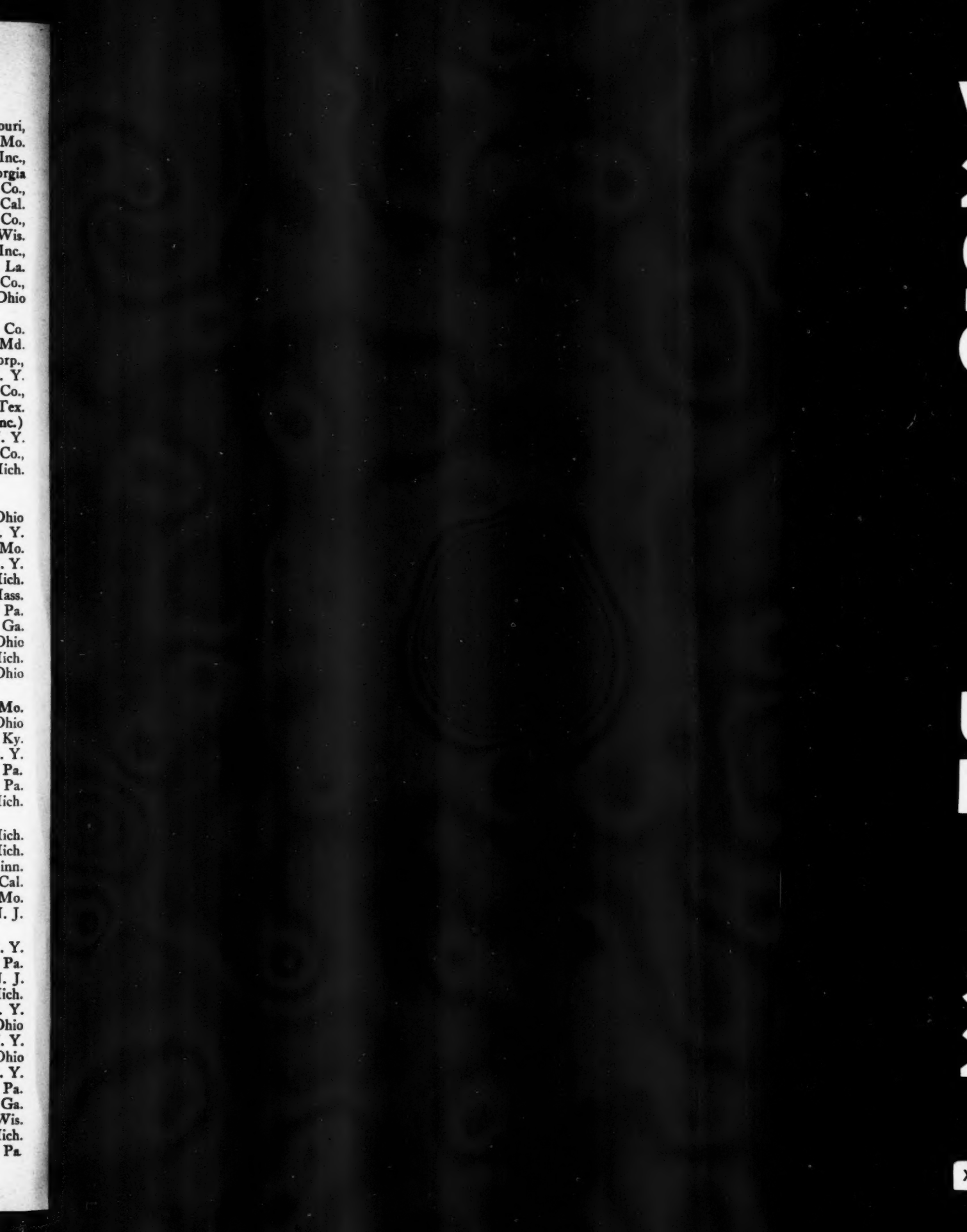
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